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Training Foundry Apprentices in France

Making Directors of Molding Machine Operators and Foremen—Much of the Work Done in Green Sand Rather Dry

BY H. M. LANE

IN this country we frequently hear complaints and lamentations about the fact that nobody is making molders, but in France the old-fashioned apprentice system still exists in many shops. A good many apprentices are under instructions and will turn out to be fair molders. One plant is doing remarkable training work, and to a large extent with nothing but a desire to further the foundry cause. This is the plant of Ph. Bonvillain and E. Ronceray, of Paris, of which E. Ronceray is the head.

This firm maintains a foundry which has two or three interesting functions. In the first place, it serves to turn out all the heavy and special castings required for the manufacture of their extensive line of molding machinery and foundry appliances. In the second place, it serves as a demonstration plant for their molding machines, and in the third place, in order to keep a plant of this kind running as a demonstration plant, it has been necessary to take in certain kinds of work and run a portion of the foundry as a jobbing shop.

Besides Name and Age of Each Boy the Photographs Give Also the Period of Apprenticeship and the Time Taken for the Several Castings

There are twenty or thirty young men learning the molding trade. In France these boys go to work at about thirteen years of age, and some even a few months earlier. They generally serve about four years. In the Ronceray plant the boys are given careful instruction on molding, core making, operation and maintenance of molding machines and pattern making, or pattern and plate making as it is practiced in connection with the French molding machinery.

The accompanying illustrations show a portion of the sample castings turned out by the boys for a prize competition which is carried on at least twice a year. Each boy makes a casting for this competition, and the castings are then judged by a committee of outside foundrymen. In the final award of the prize, however, the boy's general foundry conduct and diligence are taken into consideration. All of the castings shown in these illustrations were made by hand and most of them in dry sand molds. On the board at the side of the casting is chalked the name of the boy, his age, and the number of months' apprenticeship he has served, and below this the number of hours which he spent in making the casting.

Whenever a boy is given a pattern the method of molding is discussed with him, and he is given such instruction as is necessary to assist him in turning out a good piece. He is also shown the cause of various failures, and whenever a casting goes wrong, the entire class of apprentices holds a port-mortem on it to determine the cause of the loss.

They are also constantly criticizing each other's work to try and improve the quality. The boys are generally allowed to pour their own work, and the entire crowd stands around until every mold is poured, and sometimes it is almost impossible to drive them out of the shop at any reasonable hour in the evening, particularly when some interesting piece has been poured and they wish to see it shaken out. Every one of the boys is a bright, active fellow, and the interest they are taking in their trade is very marked indeed. To Americans the fact that most of them wore wooden shoes would be quite a novel feature.

Another interesting thing in connection with the practice of this shop is the fact that the sand is worked much drier than it is in American shops, particularly for green sand work. As much of the work as possible is cast in green sand, and a good many difficult castings are made in this way. Several of the best of the castings shown in this competition were of green sand. As the boys complete their apprenticeship most of them find positions in other foundries where they become directors of molding machine work or foremen.

OXYGEN IN STEEL MAKING*

Advantages Claimed from Its Use in the Bessemer and Open-Hearth

Another field for the application of oxygen or oxygenated air is in the Bessemer process. We have available what might be termed intermediate ores, which, while they do not contain sufficient phosphorus to make the basic process possible, still have an amount of this element too high for use in the acid converter. If, however, the heat requirements for the process might be lowered below those of standard basic practice to correspond with the lower phosphorus in the pig iron available, we would have a process which would utilize these rather unsatisfactory products to our advantage, securing a steel better in quality than that obtained by the acid Bessemer process, and as a by-product a high-phosphorus slag valuable for fertilizer.

[Thermal requirements and heat balance are discussed here.]

We can use a mixture of 3788 lb. of nitrogen and 2353 lb. of oxygen, or a 38 per cent oxygen blast, and obtain the same thermal results in the bath as was the case when blowing a high phosphorus bath with atmospheric air.

To estimate the value of this process in dollars and cents will be difficult, for we have no standard basic practice against which to compare it. The best comparison we can make is against the open-hearth practice of making low-carbon steel. This comparison will cause criticism because Bessemer steel is recognized as inferior in quality to the open-hearth product. We will, however, risk still further criticism by making the assertion that by the use of oxygen-enriched blast we will be enabled to make Bessemer steel of almost as good quality as that of our average open-hearth steel.

In order to obtain some rough idea of cost comparison, the present low-carbon open-hearth steel requires as fuel 600 lb. of gas coal per ton, which at present costs $7.50 per net ton delivered, or a fuel cost of $2.25 per ton of steel. With the proposed basic Bessemer process along the lines shown in the heat balance we would require 0.0448 ton of oxygen per ton of steel, or with oxygen available at $3 per ton, a cost of 13.44 cents for oxygen per ton of steel.

Oxygen and the Open-Hearth Process

According to Clements (Trans. Iron and Steel Institute, May, 1922), the largest and most striking loss is that of heat lost by radiation from the bath and port ends or 44.20 per cent of total heat wasted. This figure impresses us as a most forceful argument that the open-hearth process stands in vital need of a "super-refractory." The silica brick used for the roof and port ends of the furnace is the purest obtainable and, while it is the most suitable material available, it is in our estimation far from being an ideal refractory for even the present requirements. The brick as used today has a fair life as a refractory, but is in no sense of the word a heat insulator nor is the endurance of this material in the service to which it is subjected great enough to allow us to supplement it by a heat insulator. What the industry needs is a brick so resistant to heat and metallic fumes, and one of such thermal expansion, that it will not only serve as the silica brick does today—as an uncovered arch and wall—but will stand the still more severe test of being covered with a heat-insulating material to prevent, in a large measure, the too great heat loss through these sections. As to the possibility of obtaining such a material, we see no reason to say it can not be done. Price should be of secondary consideration, for such a material once introduced would not only add materially to the life of the furnace, but would save millions of dollars in fuel cost.

In the matter of applying oxygen to metallurgical processes, our first thought is that of increasing temperatures. As our present refractories are now subjected to their maximum working temperatures, we will not consider the matter in that connection at present, but more with the idea of retaining a greater percentage of the total heat for a useful work than is the present practice. Clements gives the loss of heat by radiation from the regenerators as 15.50 per cent of the heat lost, and that from the chimney gases as 36.2 per cent of the heat lost. The chief function of the regenerating system in our present open-hearth process is that of increasing the temperature of combustion by adding sensible heat to the gases before they are burned. With oxygen available we will have another method of increasing the flame temperature,

*Extract from an extensive report by a special committee of the Bureau of Mines, organized to investigate the use of oxygen or oxygenated air in metallurgical and allied processes. It includes the blast furnace, Bessemer and open-hearth, ferromanganese and artificial gas. The chairman of the committee is M. H. Roberts, consulting mechanical engineer, Bureau of Mines. The author of the report is F. W. Davis, metallurgist, Bureau of Mines, Minneapolis, Minn. The portion on blast furnace was published in THE IRON AGE, Sept. 13, that on ferromanganese elsewhere in this issue.

which, instead of heating the gases, will simply decrease the amount of inert gases entering the furnace, and diluting the calorific intensity of the reaction. Suppose that we go even farther than the regenerators, and start by replacing with pure oxygen the air now used in operating the gas producers, increasing at the same time the steam used in order to dampen the higher producer temperature otherwise obtained. We will now secure a fuel gas of greater calorific power which may be burned from one end of the furnace only, using a mixture of oxygen and air, the oxygen content of which may be regulated as our temperature requirements dictate. From the exhaust end of the furnace, instead of passing through regenerators with their accompanying expense and heat loss, let us carry the reduced volume of gas through a waste-heat boiler, lower its temperature to 300 deg. C., and utilize the heat above this temperature in the generation of steam.

With a process of this nature we will not only eliminate the checkerwork, but will take a big stride in the way of efficient combustion and proper direction of the flame. In our present furnace, any mixing of air and fuel gas must be done in a crude manner, in that the only burner possible, in order to withstand the action of the intensely hot gases and flame during half of the operation, must be of a highly refractory material, and even this is always losing efficiency as a gas mixer due to its "slagging" away. If it were not necessary to reverse the flow of gases to the furnace, it would become possible to construct an efficient burner which would not only effect a perfect mixture of the gases, but which might be used effectively to direct the flow of gas in any manner desired. It is just possible that, with a device of this kind, we would be able to direct the flame to follow the bath more closely than is possible today, and relieve the roof to some extent of its high-temperature condition.

Available Fuel in Open-Hearth Process

Another phase of the question of the use of oxygen in the open-hearth is found in the matter of available fuel. The ordinary process requires for success large volumes of gas made from the most expensive grade of industrial coal, but we feel assured that suitable gas can be manufactured from much cheaper material by the aid of oxygen, and in this line it is well to consider blast furnace gas. This fuel is unsuitable for open-hearth work because it is a low-calorific, slow-burning gas, practically devoid of illuminants. Burning blast-furnace gas with oxygen will not improve this lack of illuminants, but it will increase the speed of combustion and increase the calorific intensity of the flame beyond that of current open-hearth practice. This is only one of the many cheap fuels which should be tried in this respect.

Chemical Problems of the Open-Hearth

The open-hearth process is essentially one of oxidation. Pig iron and scrap steel are charged in a furnace, melted down, and the impurities are oxidized out, leaving as a product a material which has lost a great part of its phosphorus, sulphur, silicon, manganese and carbon, the chief oxidizing agent being iron ore. In introducing iron ore we are also introducing further impurities, mainly phosphorus and silica, which have a tendency to lower the quality of the product. If we could accomplish our oxidation by means of oxygen we would avoid these additional impurities.

Our next consideration is the time element. To oxidize a bath to the desired quality, using iron ore, requires from 3 to 5 hr., but if we would use oxygen for this purpose it may be accomplished in less than 30 min. Oxidation by iron ore is an endothermic reaction, as it requires the reduction to iron of the ore charged, and therefore absorbs heat in the furnace. Oxidation by oxygen is highly exothermic and will add greatly to the available heat in the bath, another factor which will tend to shorten the process.

As to cost, we pay from $4 to $6 per ton of iron ore for this purpose. This ore contains about 90 per cent Fe_2O_3 or 27 per cent available oxygen. We are of course utilizing the iron content of the ore as well, but that is incidental to the fact that the ore is used for its oxidizing power; 98 per cent oxygen for this purpose at $3 per ton will compare favorably in the cost balances to 27 per cent oxygen introduced as ore at a cost of from $4 to $6 per ton even when crediting the latter practice with the iron retained in the bath. Also, inasmuch as this process will decrease the time requirements by about 3 hr., our capacities will be greatly increased and our fuel and overhead charges reduced accordingly.

In speaking of chemical possibilities connected with the use of oxygen in the open-hearth furnace, it is well to consider the higher quality steels. Steel made properly in the electric furnace is recognized as being of superior grade and purity to open-hearth steel, and commands a much higher price. One of the main factors which makes the difference in the two products is the almost total absence of oxides in electric steel, which is accomplished by finishing the steel under very reducing conditions. The current open-hearth process is incapable of duplicating these reducing conditions, inasmuch as the products of combustion are always of an oxidizing nature, and for that reason a highly reducing slag, such as is necessary in the electric process for the final purification, can not be maintained. However, if we have oxygen available in the open-hearth, we will be enabled to maintain sufficient flame temperature by partial combustion of the gas, and in this manner make possible a highly reducing atmosphere in the furnace. Under these conditions a reducing slag may be made, and the bath cleaned of its oxides, producing a steel which will be equal in every respect to that made in the electric furnace.

General Conclusions

The foregoing study of the open-hearth process has convinced us of the following:

1. While the application of oxygen for combustion in the open-hearth will effect some saving in fuel energy, with our present refractories the saving will be in the form of a by-product and not of practical value. However, if we can prepare refractories which will withstand much higher temperatures, the application of oxygen to the process will be of great value, both in saving fuel and increasing materially the speed of the process.

2. That the application of oxygen for combustion with an idea of substituting cheaper fuel for the very expensive fuel used today is a field of particular promise.

3. Taken from the standpoint of quality of product, the substitution of oxygen for air in the last part of the process will enable us to make, in the open-hearth furnace, steel of electric furnace quality.

4. That the substitution of oxygen for the iron ore now used as an oxidizing agent will not only give a higher grade product, but it will decrease the time required for the process by about 3 hours.

United States Exports

Among the 50 largest items of American exports in the first half of 1923, grouped according to value, there were five items of iron and steel products, seven of machinery, two of nonferrous metals, while coal and coke, considered together, occupy second position of the entire group, being exceeded only by raw cotton.

Figured by quantity rather than by dollar value, the largest item of all of our exports, both in 1922 and 1923, consisted of coal and coke, which show more than double the quantity this year than was shipped last year.

Exports not expressed in pounds included automobiles, to the extent of 69,941 passenger cars and 11,578 trucks and buses in 1923, both being more than double last year's figures. Locomotives fell off from 212 to 112, but agricultural tractors jumped from 3926 to 10,223, while freight cars at 7481 in 1923 were almost four times the 1957 of the previous year.

During the first half of 1923 our best customer was Great Britain, with Canada, Germany, France, Japan, Cuba, Italy, Mexico, Argentina, Australia, Netherlands and China following in the order named. Each of these 12 countries took upward of $50,000,000 of goods. Our sources of imports in the six months, again carrying the figure to the $50,000,000 mark, were, in order: Cuba, Great Britain, Canada, Japan, Straits Settlements, China, Argentina, Germany, France, India, Mexico, Brazil and Chile.

Washing Limestone for Blast Furnace Use

Plant Electrically Driven from Quarry to Storage Bins and Almost Automatic—Effort to Get a Flux Free from Dirt

IN response to complaints of dirty limestone from blast furnace operators, particularly those represented in the Southern Ohio Pig Iron and Coke Association, an installation of a washing equipment for cleaning the stone has been made at plant X of the Marble Cliff Quarries Co., Columbus, Ohio.

The stone deposits of the company are, generally speaking, about 50 ft. in depth, and the fluxing stone ledges lie usually about 20 ft. below the surface. All stone above this depth is used as ballast and in road work. The stone is quarried by steam shovels, after being blasted, and loaded into 15-ton dump cars for transportation to the crushers and washing apparatus. The system of transportation used is an indication of the economical processes evident throughout the plant, as only four men are required to operate the system from the stone ledge to the primary crusher.

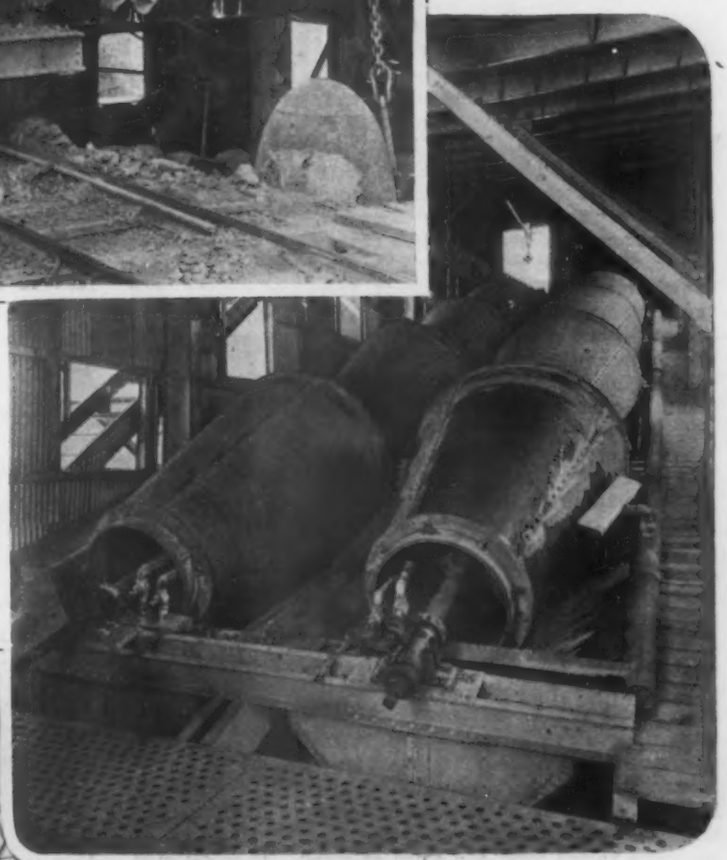
The transportation system used is the Woodford remote control system, electrically operated through a third rail. The line is double tracked with the excep-

Power for the Transportation System Is Transmitted Through a Third Rail. An electrically operated reversing cam prevents collisions on the single-tracked portion of line over the bridge shown at the left in upper view

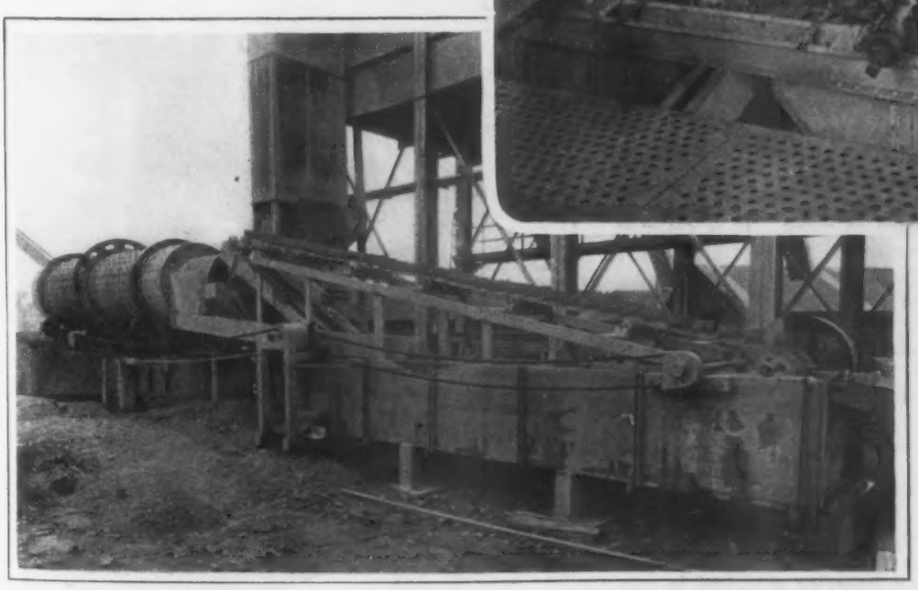
Above — The Loosened Stone Is Loaded into Dump Cars by Steam Shovels, the Firemen of Which Spot the Empties and also Deliver the Loaded Cars to the Main Line

At Right — The Operator of No. 2 Tower Controls the Movement of the Cars, Loaded and Empties, for a distance of Three-fourths of a Mile

Car Dumper at the Primary Crusher. The car reversing cam is shown at the left



After Being Scrubbed the Stone Passes Through Rinsing Screens, Which Remove the Last Particles of Dirt from the Flux. Storage bins are located beneath this series of screens, from which the stone is loaded into railroad cars for shipment to the blast furnace



The Scrubber Operates Similarly to a Tumbling Barrel. The bucket elevator carries the stone to the rinsing screens

tion of the portion crossing a bridge about midway between the quarry and the crusher. When the car is filled with stone by the steam shovel, the shovel fireman, who also spots the cars for loading, by means of a push button located on the shovel, starts the car on its way to the crusher. The fireman of the shovel usually controls the movement of the cars for a distance of 150 ft., though this distance depends on the location of the shovel, and he delivers them to the main line, where an operator in a tower, located where he can secure a view of the entire quarry, takes charge of the loaded car for a distance of about one-quarter of a mile. He in turn delivers the cars to the second towerman, who handles it for a distance of about three-quarters of a mile.

The importance of this man's position is evident when it is said that it is his duty to handle the cars, both loaded and empty, over a bridge 350 ft. long, which is only single tracked. To prevent any possible chance of a collision occurring on this bridge, reversing cams have been installed at each end. This prevents cars from either direction going upon the bridge unless re-

leased by the tower operator. Thus it is impossible for a collision to occur through lack of observation from the tower.

A third tower operator handles the cars a distance of about 1000 ft., and as he is located directly opposite the primary crusher, he also operates the car dumper. When the loaded cars reach the dumper a cam arrangement automatically reverses them for the trip back to the quarry. An elaborate system of electrically controlled switches gives great flexibility to the movement of the cars, enabling the operators to keep four steam shovels, operating at distant parts of the quarry, continuously supplied with empties.

The first step in actually preparing the flux for blast furnace use is when the stone is dumped into the primary crusher, operated by a 200-hp. motor. Some pieces of stone weigh as much as 5 tons. The crushed stone drops upon a 60-in. rubber belt conveyor driven by a 75-hp. motor and is dumped into the main hopper in the screen house. From this hopper it is fed to two main screens, and the sizes between 8 in. and 4½ in. drop into the bins built beneath. The larger pieces of stone pass over the screen to conveyors, and then through chutes to three smaller sized crushers to be further broken up. From these crushers the stone is picked up by bucket elevators and taken to a series of what are called re-screens, and the different sizes soon find their way to the proper bins for loading.

The stone destined for blast furnace use is conveyed over a 30-in. belt conveyor to the washing plant. This conveyor is elevated about 30 ft. from the ground, and the stone enters a chute for the descent into the scrubber. The water for washing purposes is pumped into the chute at the same time as the stone.

The stone and water enter the scrubber, a revolving cylinder 30 ft. long and 5 ft. in diameter, driven by a 100-hp. motor, at one end. On the inside of the scrubber is a series of fins riveted to the casing for the purpose of forcing the stone forward to the discharge end of the scrubber; and the revolving action of the cylinder, throwing stone against stone, tumbling over and over, and being forced forward, puts all particles of dirt into suspension in the water. The water from this scrubber is wasted away at the discharge end.

The washed stone is discharged from the scrubber to a continuous bucket elevator, and is conveyed to a series of revolving, cone-shaped rinsing screens ranging from 1½ in. down to "sand." Flux stone sizes pass over the 1½-in. screens. All stone passing through 1½ in. is separated into smaller sizes and prepared for uses other than flux. Clean, fresh water is continually played on these screens, both inside and outside, and as a result, when the stone passes through and over the screens to the storage bins, it is free from dirt of any kind. The flux is then ready for loading into railroad cars for shipment to the blast furnaces. The sand accumulated in the washing operation is conveyed into settling tanks, and from there by a bucket conveyor to storage bins.

The entire plant, operated electrically and almost automatically, requires a minimum of workmen. From the primary crusher to the storage bins, the plant requires only fifteen men to operate it, and in this number are included electricians, oilers, millwrights and crusher attendants. The plant has a rated capacity of 3000 tons of flux per 10-hr. day, but as high as 4200 tons of all sizes have been produced and shipped during this period.

Portable Sandslinger Molding Machine

A portable type Sandslinger molding machine of particular interest to general jobbing shops has been added to the line of the Beardsley-Piper Co., 312 Union Park Court, Chicago.

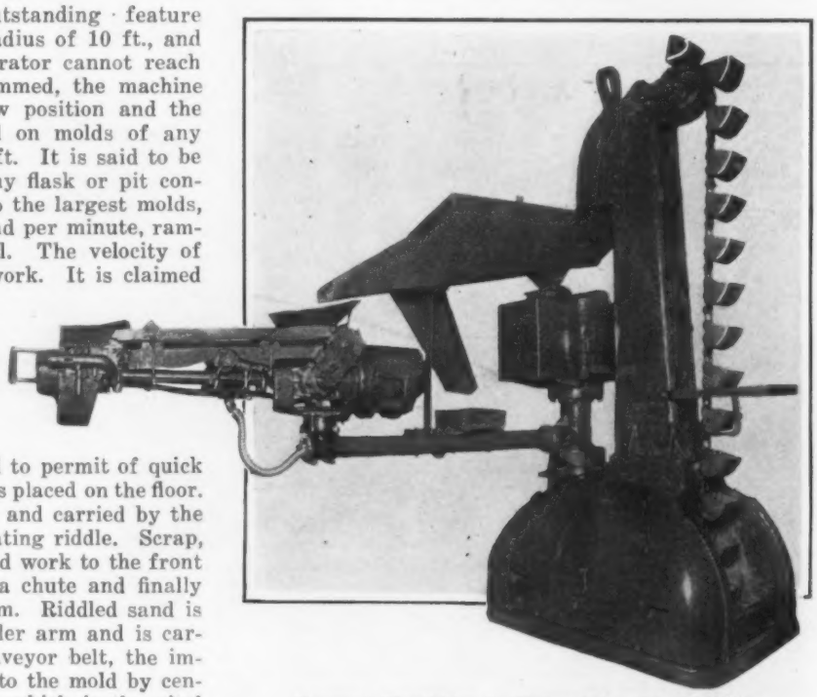
Unusual flexibility is an outstanding feature claimed. The jointed arm has a radius of 10 ft., and if a mold is too large and the operator cannot reach or cover the entire flask being rammed, the machine may be lifted and placed in a new position and the ramming finished. It can be used on molds of any size and will ram to a depth of 10 ft. It is said to be used economically on pit jobs or any flask or pit containing from 5 cu. ft. of sand up to the largest molds, and ram 10 cu. ft. or 1000 lb. of sand per minute, ramming all that three men can shovel. The velocity of the sand varies with the class of work. It is claimed that the machine will not wear or damage the pattern, as the first sand out of the ramming head covers and protects it.

The machine is electrically driven and compressed air is not required. A hydraulic leveling device incorporated in the base is said to permit of quick leveling-up as soon as the machine is placed on the floor. The sand is shoveled into a hopper and carried by the vertical bucket elevator to an oscillating riddle. Scrap, gaggers and other refuse in the sand work to the front of the riddle and are delivered to a chute and finally into a scrap box mounted on the arm. Riddled sand is deposited on a hopper on the impeller arm and is carried to the impeller head by a conveyor belt, the impeller head discharging the sand into the mold by centrifugal force. The impeller head, which is the vital part of the machine, not only throws sand at high velocity but forms it into wads or compressed handfuls preparatory to projecting it into the flask. Three separate motors are used, one for the impeller head and belt conveyor, one for the riddle, and one for the bucket elevator.

On Aug. 9 the Ford Motor Co. produced 7225 cars and trucks; on Aug. 11, 7236; on Aug. 13, 7270. Each, in turn, was a new high record.

Assigned Car Order Case Postponed

WASHINGTON, Sept. 18.—The Interstate Commerce Commission has again postponed the effective date of its assigned car order, delaying it this time from Oct. 1 to Nov. 1. It is understood that the reason for this action was to permit the commission an opportunity to give further study to applications for reopening of the case. Among those who have sought a rehearing are iron and steel producers who own private railroad cars.



Unusual Flexibility Is Claimed for this Portable Type of Molding Machine, Which Has a Jointed Arm with 10-Ft. Radius and May Be Moved from Place to Place During the Ramming of a Large Mold. It will ram to a depth of 10 ft.

President Coolidge's Tariff Policy

White House Will Follow the Limited Inquiry Plan of President Harding—Commission Expected to Begin Work Abroad at Early Date

BY L. W. MOFFETT

WASHINGTON, Sept. 18.—Having resumed hearings under the flexible provisions of the Fordney-McCumber act, following its summer recess, interest is being manifested as to when the Tariff Commission may authorize investigations abroad under these provisions. It had been expected that such authority would be granted before the commission began its recess, but, for some reason as yet unexplained, such authority has not been given.

Disturbed economic conditions of Europe have been mentioned as one cause for the delay, but this has not been accepted as an entirely adequate reason. It has been pointed out that conditions in Europe have been far from normal ever since the armistice, but despite that fact it had been originally intended to begin investigations abroad under the flexible provisions. Another reason for the delay, which is given a great deal of credence, is the change in the Administration brought about by the death of President Harding. The commission is said to have been about ready to authorize investigations abroad, but was compelled to abandon the plan because of the unexpected death of Mr. Harding. The result was that the commission faced an entirely new situation. After a rather heated dispute between two groups in the commission, although statements of the commission have sought to deny there was any serious difference of opinion, the late President Harding had mapped out a program upon which the commission should proceed.

President Harding's Position

Mr. Harding took the view of the group headed by Chairman Marvin of the commission that the latter was not empowered to open wide without limitation any or all schedules of the tariff act with a purpose to making investigations upon its own initiative and recommending any changes that it might feel were justified. It was the Culbertson group which had conceived the idea that the commission did have such a blanket authority and this variance of view in the commission became so pointed, according to reports that apparently are well founded, that it was taken before Mr. Harding, and was settled by him.

With the commission given to understand its limitations, it had proceeded to follow out the program and in doing so to authorize investigation abroad. But upon the advent of Mr. Coolidge as President, the commission is said to have been uncertain as to what his attitude might be.

The President recently made it known that he was opposed to tariff tinkering and desired that business be not disturbed unnecessarily and made it plain that he would not authorize changes in rates under the flexible provisions unless investigations of the commission made it clear that revisions were thoroughly justified.

President Coolidge's Policy

Not until last Friday, however, did it become known at the White House that President Coolidge proposes in effect to follow the program of Mr. Harding with respect to limitations of the commission. It was clearly indicated that President Coolidge shares the view which was held by Mr. Harding that the commission has no authority to make wholesale investigations on its own initiative which would be equivalent to actual and complete tariff revision. At the same time, it was made known that President Coolidge is of the opinion that the commission does have authority to initiate certain investigations without waiting for the filing of formal complaints by those who are seeking changes in rates under the flexible provisions. It is believed, however, that President Coolidge will look askance upon and will discountenance any efforts to initiate widespread investigations, but will insist that they be restricted entirely to studies and hearings that are shown by outstanding facts to have been well taken. It was made plain also that before initiating investigations the commission will be required to get the approval of the President.

With this view of President Coolidge becoming known, it is believed that the commission in the near future will announce plans to begin investigations abroad. Among those which it is expected will be scheduled first are those relating to pig iron and Swiss files. It had been expected that these investigations would be under way by the first or middle of August. The domestic inquiry as to these two subjects has been completed. It is assumed that the investigation as to magnesite in which the applicant is seeking a reduction of rates, as contrasted with application in the pig iron and Swiss file cases, in which increased rates are sought, will not be undertaken abroad until after the domestic inquiry has been completed.

For Higher Duty on Swiss Files

Application for a higher duty on Swiss files was made to the commission by the American Swiss File & Tool Co., Elizabeth, N. J., through its president, P. F. Reichhelm. The Swiss File & Tool Co. particularly is desirous of better protection on the smaller size files, up to 6 in., according to the application. It is pointed out by Mr. Reichhelm that in 1920 total sales of agents of the company were $262,968.38. The entire product of the company was sold to E. P. Reichhelm & Co., Inc., thus relieving the producing company of the selling and administration overhead. At that time, the total overhead of the company, according to the application, was about 82 per cent.

The president of the company stated that it was the belief of the company that it would be greatly to its advantage to sell direct to jobbers and therefore in 1921 the company became its own distributor. This involved the building up of the sales organization and executive expense, which it is declared, would have been out of proportion even if the sales remained at the 1920 figure, but the application says the sales in 1921 dropped to $107,521. The overhead with labor at part time is placed at 134 per cent. With the sales decreasing, the application points out, it became necessary to work on part time, which increased the burden.

The petition adds:

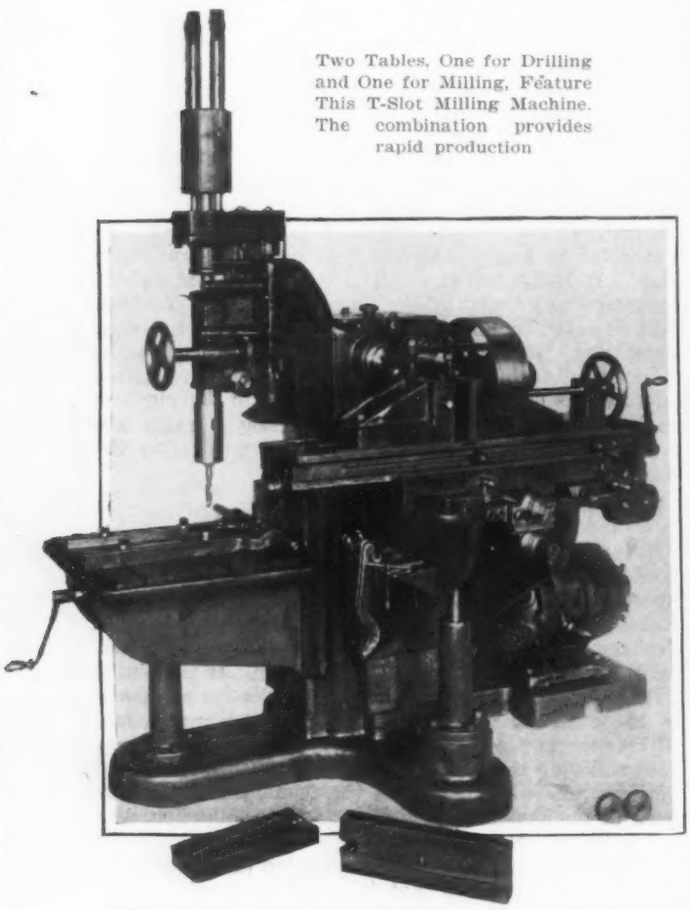
"All of this was suddenly imposed upon this organization when the business depression reached its peak, but we feel we will be better off in the long run to sell direct to distributors even though we must temporarily suffer the penalty of carrying the added selling expense, because the signs already have indicated a healthy increase in our business."

Passing upon a complaint of the National Supply Co. of Pennsylvania versus the Baltimore & Ohio, et al., against a rate of 27c. on wrought iron pipe from Pittsburgh to Mannington, W. Va., the Interstate Commerce Commission has ordered the carriers to reduce the rate to 19c. not later than Nov. 26. Reparation also was awarded.

T-Slot Milling Machine

Designed especially for the rapid production of T-slots in locomotive driving box adjusting wedges, the combination milling and drilling machine shown has recently been built by the Harrington Co., Philadelphia.

One side of the machine is equipped with a drill spindle provided with hand and power feed with automatic trip. Two holes on close centers are drilled in each wedge block, thus removing most of the metal for the subsequent milling operation. The vertically adjustable table under the drill spindle has adjustable guides and variable stops to facilitate rapid drilling. The two strips on the table are adjustable sideways to the width of any wedge block. The block to be drilled is placed between the guide strips and pushed back against the first adjustable end stop. This stop is adjusted so as to locate properly the first hole. Then the wedge block is pushed back against the second stop and the second hole drilled. These two holes can be seen at the right end of the wedge block on the floor at the left.



Two Tables, One for Drilling and One for Milling, Feature This T-Slot Milling Machine. The combination provides rapid production

The milling side of the machine has two parallel spindles, running at different speeds and driven by spiral gearing flooded with oil. The milling table has vertical adjustment and carries a compound table with movement, in and out, parallel to the axis of the spindles and also transverse movement at right angles to that axis. The transverse movement has power feed and automatic trip for stopping the feed at any predetermined depth.

A specially designed vise mounted on the table, holds the wedge blocks with a narrow edge uppermost. The sliding jaw is quickly clamped by a hand wheel and screw, an adjustable stop determines the depth of the T-slot and a clamp over the top of the jaws prevents the work from raising.

The left hand spindle, rotating rapidly, drives a straight end mill and the right hand spindle, rotating slowly, drives a T-slot cutter, so that both cut at about the same surface speed. The table is fed from left to right, the end mill first removing the metal left by the drilling operation and then the T-slot is cut in as the work is fed toward the right-hand spindle.

A base extension carries the belt-connected motor. This should preferably be of the adjustable speed type, to give a range of spindle speeds for cutting different materials. Four different feeds can be obtained by means of constant center change gears. It is claimed that the use of this machine materially reduces cost of production as well as increases the output per man-hour. The machine is so compact that comparatively little floor space is required.

Industrial Works, Builder of Locomotive Cranes, Celebrates Fiftieth Anniversary

The Industrial Works, Bay City, Mich., celebrated its fiftieth anniversary with a convention and dinner at Bay City, Sept. 6, 7 and 8. Twenty-one members of the branch offices and agencies of the company were present at the convention. The dinner, which included the force at the plant, numbered more than 300. Each guest was presented a small booklet containing the history of the Industrial Works from 1873 when the company was formed to take over the shop of the MacDowell Foundry Co. at Bay City, through the period of repair work on saw-mills and the galvanizing of salt well piping, the period of building engines, boilers, gang saws and circular saws, the development into marine engineers and later into builders of steam shovels for use on standard gage railroads, which was only a short step into the company's present line of wrecking cranes and locomotive cranes. The booklet is amply illustrated with drawings of the company's executives, the plant at various stages of its development and its cranes from the type of 1882 to that of 1923.

At the dinner on the evening of Sept. 7, Everett C. Wood, the plant engineer, was toastmaster. Among the speakers were William L. Clements, president, who spoke on "Our Golden Anniversary"; Charles R. Wells, secretary and treasurer, whose address was "Fifty Years a Treasurer"; Steven Martell, blacksmith of the Industrial Works for the past 43 years, who spoke on "Our Plant 43 Years Ago"; Fred L. Wild, whose subject was "Our Plant 24 Years Ago"; Walter B. Perry, superintendent, who described "Our Plant Today"; and Ernest B. Perry, general manager, whose address was "Fifty Years of Progress."

Building Koppers Ovens

Of the 711 new type ovens, for which the Koppers Co., Pittsburgh, took contracts since last fall, 37 already are completed and in operation, these composing the plant of the Weirton Steel Co., Weirton, W. Va., and most of the remainder will be built and in operation by next summer. The first of six units of 61 ovens each of the addition to the Clairton, Pa., plant of the Carnegie Steel Co. will be completed soon after the turn of 1924. The Koppers Co. expects to complete the 11 ovens it is building for the Battle Creek Gas Co., Battle Creek, Mich., around the first of November; the battery of 33 ovens for the Columbia Steel Co., Salt Lake City, by next spring; the 61 ovens for the Republic Iron & Steel Co., Youngstown, in November; 19 ovens for the Consumers Power Co., Zilwaukee, Mich., in December; the addition to the plant at Lackawanna Works, Bethlehem Steel Co., 114 ovens, next spring; the 47 ovens for the Trumbull-Cliffs Furnace Co., Warren, Ohio, next summer; and the 23 ovens for the Diamond Alkali Co., Alkali, Ohio, next spring.

After a shutdown of four weeks, during which extensive improvements had been made to the plant, the blooming and bar mills of the Andrews Steel Co., Newport, Ky., resumed operations Saturday last. The plant of the Newport Rolling Mill Co. resumed on Sunday night.

International Work in Testing Cast Iron

Foundrymen's Congress at Paris Takes Important Action —Chemical Specification for Pig Iron Favored —A European Malleable Association

(By Cable)

PARIS, FRANCE, Sept. 15.—The four days' technical sessions of the International Foundrymen's Congress, which was held under Government sanction, ended today. The attendance was large and the meeting, with its accompanying exhibition, was a pronounced success. Visitors were in attendance from eight different countries, the American delegation numbering 30 persons.

At the opening session on Wednesday Director L. Abbe of the Government Ministry of Technical Instruction, presided. On the platform were presidents of four national associations: E. Ramas of the Association Technique Fonderie de France; G. H. Clamer of the American Foundrymen's Association; Oliver Stubbs of the Institution of British Foundrymen, and M. Leonard of the Belgian association.

There were the usual greetings and responses, President Ramas making the opening address. The principal paper of the morning was on molding sand and the latter part of the session was given up to a discussion on the testing of cast iron. A resolution advocating the beginning of international work on specifications was seconded on behalf of the eight nations represented and adopted unanimously.

Thursday's technical session was in English, papers on testing and on molding sand being presented by members of the American Foundrymen's Association and the Institution of British Foundrymen. There was also a discussion of the desirability of adopting chemical specifications for pig iron. A resolution advocating the use of such specifications was carried unanimously.

The technical session of Friday, Sept. 14, was given up to papers and discussions on malleable castings. One outcome of this session was the formation of a European malleable association, which will deal with technical but not commercial questions.

The closing session this morning had before it the apprenticeship question and the proposal for the preparation of an international dictionary of foundry terms. The Minister of Technical Education presented medals to the association presidents in attendance, also prizes to exhibitors and to apprentices in the foundry schools.

The exhibition, which was located in the Government trade school building, was on a large scale and was highly creditable. There were educational exhibits of patterns and castings, and in the equipment section molding machines and sand treating machinery were shown in operation. The registration of exhibitors reached 450 and there were 1500 visitors. Visiting ladies were entertained by a committee which took them to many points of interest in Paris. The closing banquet was a memorable occasion. The American party scattered soon after the convention, the greater part taking the tour of Belgian battlefields.

The organization of international testing work, the resolution favoring the adoption of chemical pig iron specifications, and the organization of the European Malleable Association have been commented on as the outstanding features of the congress.

What American Foundrymen Saw in Great Britain

(Special Correspondence)

LONDON, ENGLAND, Sept. 5.—On the afternoon of Aug. 28 the American foundrymen's party entrained to Sheffield, where they were met by a reception committee of the Sheffield foundrymen and brought to the Royal Victoria Hotel. The evening was spent in getting acquainted as also in meeting friends gained by correspondence.

At the Hadfield Plant

On Wednesday morning, Aug. 29, the party was motored out to the Hecla works of Hadfields, Ltd. Sir Robert Hadfield had come down from London especially for the visit and with P. B. Brown, the managing director, received the visitors and showed them about the great plant. The principal products are manganese steel castings up to 35 tons in weight, entering into all kinds of industries, high grade steels for drilling and cutting purposes, crushing machinery parts, shells, guns, etc. The works, covering a great acreage, are peculiarly well laid out, with large buildings admirably lighted and with equipment driven electrically and of advanced types. The word quality is written all over the establishment in its best sense, for the record of good work produced, even during the war stress, is unsurpassed.

After seeing the electric furnaces at work, observing the action of the great shell piercing press, the railroad crossing and frog shop, the rolling mills for fine steels, etc., the party was entertained at lunch, with Sir Robert presiding, and giving an address of welcome and an explanation of the principles involved in the plant development. The usual toasts were drunk, responses being by President Clamer of the A. F. A., and Mr. Brown of Hadfields, Ltd. On adjournment motion pictures were shown in the dining room of the works, illustrating many phases of the work done at the plant, particularly during the busy war days.

The party was photographed and then taken across the dividing line into the great works of Edgar Allen & Co., whose specialty is in railroad crossings and track work, with large steel casting facilities for all classes of work. One of the special features was a sand storage with conveying systems for proper mixing and final milling arrangements for producing a molding sand suitable for the high grade work made. Steel from converters was poured at extremely high temperatures over the lip of the ladles, and this was made possible by the attainment of the highest degree of refractoriness in the sand in the first place. The resulting castings were notably smooth and clean as a consequence.

Another luncheon was served, through the courtesy of the Allen company, during which Mr. Clamer, as president of the American Foundrymen's Association, conveyed the thanks of the delegation to the officers of the Allen works. There was a brief response by the manager. In the meantime the ladies of the party had been entertained at tea by Mrs. T. H. Firth, at Prior Bank, one of the splendid homes of England. The rain, unfortunately, prevented taking full advantage of a motor run to the Derwent Valley Water Works.

A formal dinner was given in the evening by the Sheffield and district branch of the Institute of British

Foundrymen. John Shaw, president of the district branch of the institute, served as chairman, and there were present as additional guests the Lord Mayors of Sheffield and Rotherham, as also Sir Robert Hadfield. After the usual toasts to the King and the President, V. E. Minich, New York, toasted the City and Commerce of Sheffield, to which Lord Mayor W. C. Fenton responded. Sir Robert Hadfield then toasted the American Foundrymen's Association, President G. H. Clamer responding; and lastly Dr. Richard Moldenke toasted the Institution of British Foundrymen, to which Past President T. H. Firth of the institute responded.

British vs. American Test Bar Practice

Thursday, Aug. 30, was given over to a motor ride in the environments of Sheffield, visiting many points of interest. The American party left for Manchester Friday, Aug. 31, in the afternoon. In the evening Dr. Richard Moldenke addressed a meeting of the Sheffield branch of the institute, remaining behind the party for the purpose. He spoke on "American Foundry Practice," taking up present tendencies and methods of operation. The discussion that followed, in which Doctors Hatfield and Longmuir took part, among others, brought out several interesting facts. One was that English foundry iron blast furnaces were run very easy, seldom making more than 75 to 100 tons a day—often tapping out but twice in 24 hours and hence yielding high carbon and high quality metal. The analyses, day by day, were widely varying, however, and hence careful checking up of pig iron purchases was essential. Again, on the subject of specifications—particularly on the matter of test bars—the consulting engineers who were called in by the purchaser of castings had their own ideas on the subject and dominated the foundrymen to an extent that would not always be tolerated in the United States. Hence the direct statement that test bars should represent castings, and consequently one bar is insufficient. This is entirely contrary to the American conception, which holds that the test bar simply gives the quality of the iron going into the castings and in no way represents the castings themselves.

This controversy will probably be the bone of contention at the Paris meeting of the foundrymen, as without some modification of the viewpoint of either side an agreement on an international basis will be impossible.

Address by Doctor Moldenke

Doctor Moldenke repeated his address before the Manchester branch of the Institute of British Foundrymen at the College of Technology, Saturday afternoon, Sept. 1, where another large audience of foundrymen and metallurgists met him. The discussion was just as animated as at Sheffield, and among other things brought out the fact that some of the foundrymen present agreed with the American viewpoint on the subject of test bars. There was a long discussion on rational cupola practice, desulphurization of cast iron, the abuse of shot in the cupola, fluxing, and many other topics such as are of equal interest in the United States.

One interesting item came to light incidentally. The late Thos. D. West was born in Manchester, England, and the American party came to this city on an anniversary day of his birth. His son, Ralph West, of the West Steel Casting Co., Cleveland, a member of the party, was able to obtain a certificate of birth of his father, and located the old home. All the foundrymen of Manchester united in paying a tribute to the memory of this great American foundryman.

Visitors Dined at Manchester

On the arrival of the party in Manchester, Friday evening, they were given a splendid dinner in honor of the occasion. The Manchester foundrymen outdid themselves in hospitality to their guests, and adjournment was had at a very late hour. The dinner was given by the National Ironfounding Employers' Federation, Oliver Stubbs, president; and at the Midland Hotel. After the usual toasts to the King and the President by the chair, "Manchester" was proposed in a toast by Walter Wood of Philadelphia, and responded to by the Rt. Hon. the Lord Mayor of Manchester, Councillor W. Cundiff. The toast for "The American Foundrymen's Association," proposed by Mr. Stubbs, and supported by F. J. Taylor, was responded to by President Clamer of the A. F. A. There was abundant good music during the evening.

Saturday, Sept. 1, had the morning spent in an excursion about Manchester, visiting among other places of interest the large Ford assembling plant—the Ford foundry being in Cork, Ireland. The afternoon was occupied by the meeting of Manchester foundrymen, at which Doctor Moldenke gave his address on "American Foundry Practice." On Sunday an excursion was given the visiting party to the old Roman town of Chester. This is one of England's famous cathedral cities and the wonderful structure was duly appreciated. The Roman remains of the wall about the town were seen and a long walk taken along the parapets. In the afternoon a most enjoyable trip by boat up the River Dee—the restful river—was had, and after entertainment at dinner at the Grosvenor Hotel the party returned to Manchester late in the evening.

Monday, Sept. 3, the party was taken through the Metropolitan-Vickers Electrical Co., Ltd., plant, where the Westinghouse products are made. The enormous foundry, where not only the great variety of smaller castings required in the production of electrical machinery were produced in finely finished form, but huge turbine castings and generator frames were produced, came in for a full share of admiration by the American foundrymen. In the evening high tea was given the visiting party at the Victoria Hotel by the Lancashire branch of the Institute of British Foundrymen, after which the party was taken to the performance at the Manchester Hippodrome. After the many strenuous manifestations of the wonderful courtesy given the American party by the British foundrymen, the Tuesday morning period of rest was really needed. In the afternoon the visitors entrained for Birmingham.

(From Another Correspondent)

MANCHESTER, ENGLAND, Sept. 3.—Dr. Richard Moldenke, the well known American foundry metallurgist, delivered a lecture before the Institution of British Foundrymen at Manchester College of Technology on Saturday, Sept. 1. He reviewed modern American practice and discoursed at considerable length on the operation of the cupola. Rule of thumb cupola practice, he said, means a high coke bill. It is possible to melt 10 cwt. of iron to 1 cwt. of coke, but in many foundries only half this is obtained.

The adoption of uniform cost systems for each class of work has been a great step in advance for American foundrymen, it was stated, though it was not uncommon at one time to get quotations for castings from different firms varying from 2½c. to 6c. per pound. Yet it should be clearly understood that the American foundries are aiming at high quality castings even more than quantity. Strength and machinability are considered all important.

After saying that the high sulphur content of American pig iron is causing concern, the speaker described a method in use in some American foundries for desulphurizing iron by means of soda cakes. The slag is first skimmed off the ladle and a very small quantity of soda in the form of cake is then thrown into the molten metal. In 2½ minutes 40 per cent of the sulphur is removed and if the metal is still sufficiently hot the operation can be repeated and 90 per cent of the sulphur altogether removed. In one foundry the percentage of sulphur was 0.18 and it was reduced by the process to 0.045. Krupps at Essen are using this desulphurizing method and American foundrymen are looking to it to solve some difficult problems especially as much of the scrap has a percentage of 0.26 sulphur, and when the wartime castings came to be broken up this will probably be increased to 0.32. It is quite necessary, however, that the slag be all removed first and cupola design is being modified in the United States with this end in view.

An interesting statement was that American em-

ployers were being forced more and more to install machinery because of the shortage of labor, which Doctor Moldenke attributed to the faulty United States immigration law. He believed in developing machine work, and considered it profitable to put the highest skilled labor on molding machines. Employers should not lose sight of the human side and machinery should be to relieve labor of drudgery.

The gating of molds was referred to as one of the most difficult parts of foundry work. Top gates are now preferred in America, even cylinders being poured with several gates at the top. Bottom gates mean that the metal has to travel a long way through the sand before it reaches the mold, the result being that it becomes sluggish. Then as to cupola charging, the great drawback of side charging is that metal and coke are not level; thus the metal becomes oxidized because of the blast striking it. He emphasized the fact, in answer to questions, that the cupola is an exceedingly simple piece of apparatus. There should be 4 in. of coke between the charges and if correctly charged the metal should run from the tap hole 10 minutes after the blast is put on. The blast pressure, Dr. Moldenke said, in answer to another question, should not fall below 4 oz.; a pressure of 7 oz. is satisfactory. It is most important that the pressure be kept uniform.

A large party of American foundrymen and members of the Institute of British Foundrymen visited the works of the Metropolitan-Vickers Co. at Trafford Park, Manchester, on Monday afternoon, Sept. 3. Every facility was given to the visitors to get an insight into the methods and organization of the company, which at the present time employs about 7000 to 8000 men. Tea was served in the staff canteen and Mr. Bailey, the works manager, expressed the pleasure of the firm at having such a representative company as guests. He said that in the Metropolitan-Vickers foundry they had expended £80,000 during the last three years. He considered the foundry the basis of the engineering industry. During a visit to America he had been greatly impressed with the methods of handling materials in the foundries. Mr. Bailey stated that until five years ago the Metropolitan-Vickers works belonged to the Westinghouse company and that they had a working agreement for the exchange of designs and manufacturing methods. He considered, therefore, that the two companies had an interest in research work in both countries.

Thermal Treatment of Molded Pieces*

Imperfections in Tempering Semi-Steel—Density of Metal Affected by Heat Treatment, Which May Produce Porousness

IN a recent memorandum, Jean Durand pointed out the results he had obtained by the thermal treatment of test bars resulting from cast metals. The improvement noticed, in the course of tension and shock tests, shows what we can hope to obtain from these thermal treatments, especially on semi-steel shells. Aside from this, Messrs. Botchvar and Kalinnikoff presented at the Congress of Russian Metallurgists, held in November, 1920, the results of their experience on thermal treatments of semi-steel. They found more especially, by heating at 800 deg. C. (1472 deg. Fahr.), followed by re-heating at 500 to 600 deg. C. (932 to 1112 deg. Fahr.)—on castings at 3 per cent total carbon, 2.2 per cent graphite, 0.85 per cent Mn., 1.1 per cent Si.—an increase of 21 per cent for the transverse strength, 10 per cent for hardness and of 10 to 12 per cent for shock resistance.

During the war the question of thermal treatment of semi-steel occupied considerable time in the laboratory experiments, as well as that of manufacturers. Large lots of shells were submitted to acceptance tests at the shops and to firing tests. Without entering into all the details as to the data established and results obtained, which were fully reported to the permanent Bureau for Artillery Products in 1917 and 1918, we wish to call attention to the following points, which we believe essential in connection with the application to practice:

1.—So-called semi-steel, which consists schematically of laminas of graphite which are inclosed in pearlite, often runs rather high (0.8 to 1 per cent) in manganese, and is therefore critically affected by tempering. Samples of 20 mm. (0.8 in.) thickness (the average thickness of the walls of a shell of 155 mm. or 6⅛ in. diameter) show a lively action in tempering. At 850 deg. C. (1562 deg. Fahr.) in the water, a strong penetration of tempering reaches to the center. By reheating at 500 deg. C. it is possible to preserve for the bar a considerable hardness in its entire thickness, say from No. 250 to 270 Brinell units.

But this large tempering power increases considerably the chances of imperfections in the tempering, so much more because the laminas of graphite play the part of internal sharp grooves and because cast iron has far from the homogeneity of constitution which is found in wrought steel. To avoid such occurrences we are thus forced to adopt medium speeds of cooling, which are relatively weak (oil temper, temper with limited duration, etc.).

2.—Owing to the non-uniformity of mechanical properties in a series of iron castings, even when these castings come from the same run, it seems necessary to have recourse to a preliminary and final individual grading, for instance by bar tests, and to obtain reheating temperatures, if definite and fairly constant mechanical qualities are desired.

At the same time it is known that there is no chance to recognize the mechanical properties of iron castings if we base ourselves on the results of tests taken with test bars that are run separately from the castings. This is because the condition and properties of the metal are a function of the mass of the product. The phenomena of penetration of the temper hardness due to sections will be greater, in the case of thermal treatment, than usually exists between castings and test bars.

3.—Finally, the most important thing to call attention to seems to be, that the thermal treatments determine the density of the metal. This density is established by means of the hydraulic test. Under a water pressure of 390 kg. per sq. cm. (5550 lb. per sq. in.), *all* shells of 155 mm. (6⅛ in.) which had undergone a double heating (tempering followed by reheating, or double temper in case of failure of the first operation) and a large number of those which had undergone only one heating, have shown a density which revealed itself in a slow drop of pressure and even by a trickling out of water on the outer surface, if the duration of the test was prolonged.

This density is connected with the well-known phenomenon of the expansion of iron castings when heated. These phenomena have been especially investigated by Outerbridge, Rugan and Carpenter. This expansion shows itself only in gray castings which contain free carbon or graphite. It grows with the percentage of silicon and the number of heatings. Hence, it is noted that this apparent increase in volume, at constant weight, can entail as a consequence a porosity of the

*Memorandum of Albert Portevin, presented to the Academy of Sciences by H. LeChatelier. Translated by E. J. Lowry. Hickman, Williams & Co., Pittsburgh.

(*Concluded on page* 794)

COLD STRIP ROLLING

Interesting Points Regarding the Process Furnished by Mill Designer

BY W. H. CLEAVER*

A NUMBER of large manufacturing consumers of cold rolled strip steel have recently been installing their own strip mills to make this product for their own plants. When the wide variety of products for which cold rolled strip steel is adaptable is considered, it is not surprising that this should be so. Large users of cold rolled strips now include manufacturers of typewriters, telephone instruments, metal moldings, adding machines, sewing machines, metal furniture, door knobs, hardware, welded tubing, shoe shanks, clothes line pulleys, electro-plated ware, razor blades, pencil sharpeners, ash trays, automobile parts, springs, etc. Many others could be named but this is enough to illustrate the great growth in the use of cold rolled strips.

A reason for the fact that many consumers are now rolling their own strips is the savings that may be effected. For example, when hot rolled strip fell from 5.50c. per lb. in November, 1920, to 3.30c. per lb. in March, 1921, cold rolled strip fell during the same period only from 8.50c. per lb. to 6.25c., base. It will be noted that the difference in base price between hot and cold rolled strip fell only from 3c. to 2.95c. per lb. When it is considered that these prices are for base gages, and that thin gages, narrow widths, specification carbon, etc., all carry an extra, it will readily be seen that the possible profit to the manufacturer of cold rolled strip steel for his own consumption is considerable.

In view of the widespread use of cold rolled strips we are getting more and more requests for information regarding processes of rolling and various other matters connected with its production. Our information is of course not new to those already in the business, but we believe it to be both interesting and valuable to those who contemplate making their own cold rolled strips.

Before going into the rolling process it is necessary to say a word about the material that is to be cold rolled. Much of the success of cold rolling depends on the quality of the hot rolled strip steel. Should there be any inaccuracy in the thickness of one edge of the hot rolled strip, this same inaccuracy will appear in corresponding proportion after cold rolling. This is due to the fact that there is very little spreading of the strip in rolling and since the width of the strip is much greater than its thickness the metal will not flow across the strip. On this account it is very important to have accurately rolled stock.

There are many mills throughout the country that make a specialty of hot rolled strip steel for cold rolling purposes, and by obtaining the stock from them better success will be assured.

The purpose of cold rolling strip steel is mainly to obtain a thinner strip than can be economically hot rolled, also an accurate thickness, a finely polished surface, and a definite degree of hardness.

Different degrees of hardness and polish may be obtained from the same stock. For example, a very hard steel is obtained by giving the strip four cold passes, but by annealing this same steel is changed to one very soft. The definite degree of hardness is then obtained by further cold rolling.

We find there is no standard classification for degrees of hardness and finish. We have found, however, the following the most useful:

Hardness Classification

No. 1. Hard Sclerescopic hardness approx.....40
No. 2 Half hard Sclerescopic hardness approx....35
No. 3 Quarter hard Sclerescopic hardness approx.30
No. 4 Soft Sclerescopic hardness approx.....25
No. 5 Dead soft Sclerescopic hardness approx....20

In flat work on which no bends are required, grade No. 1 should be used. For deep drawing work and work on which the strip is bent double No. 5 grade should be used. The intermediate grades are used for work requiring more or less bending.

The better degrees of finish are obtained by giving the strip a greater number of light passes for a given reduction and by the use of highly polished rolls. The finish classification is as follows:

A—Extra bright—extremely smooth finish.
B—Standard bright—very smooth finish.
C—Smooth bright—smooth finish.

The hot rolled strip is usually received at the cold mills in coils. These coils are placed on drums and unwind as the strip is fed into the mill.

The cold mills may be operated individually or in tandem. Individual operation consists in passing the strip through one set of rolls and rewinding on a reel. The rolls are then adjusted and the strip passed through again. This operation is kept up until the required gage and finish are obtained.

Tandem operation consists in passing the strip continuously through several sets of rolls, usually four, placed in tandem. The strips are wound on a reel after leaving the last stand. Four passes are generally sufficient to finish the ordinary grade of steel, so it will be seen that much time and labor may be saved in the use of the tandem arrangement.

It is obvious in the tandem-operated mills that each succeeding mill must run at a speed faster than the previous mill, so that the quantity of steel delivered per unit of time will be the same for all mills. It is therefore necessary to equip these mills with adjustable speed motors with special controls. These controls are so arranged that one operator, from one point, may control the speed of each mill.

During the rolling operation it is necessary to anneal the strip periodically in order that further reduction may be made. In low carbon steel the strip is generally annealed after every fourth pass, whereas in high carbon steel it must be annealed after every two passes or so.

A 50 per cent reduction may usually be obtained in four passes, so it will readily be seen that to reduce a No. 14 gage low carbon strip to No. 34 gage sixteen passes and three annealings will be necessary.

All cold rolled strip steel must be pickled to remove scale and surface impurities. This is generally done before the last finishing passes, but for dead soft steel the strip is annealed and pickled after the last pass.

After the rolling process is completed the strip is then slit to the desired width, the edges finished if necessary, straightened and cut to length. The steel is then oiled, boxed and is ready for shipment.

Cold rolled strip steels are usually manufactured in widths ranging from 6 to 20 in.

*Engineer, Philadelphia Roll & Machine Co., Philadelphia.

The Penn Steel Castings Co., with capital stock of $500,000 in cumulative preferred and 10,000 shares of common stock, no par value, has been organized by the directors of the Penn Seaboard Steel Corporation, Philadelphia, and will purchase from the latter corporation the Chester, Pa., plant, together with $500,000 of net quick assets, and in payment will issue to the corporation all capital stock and bonds. A closed first mortgage on all fixed assets of the new company will secure the bonds, assets being valued at $2,200,000, or twice the principal amount of the issue. During the first six months of 1923 the Penn Seaboard Steel Corporation showed net profits after expenses and deductions but before interest of $221,908, against a deficit before fixed charges of $225,000 during the same period last year.

A cablegram has been received by the Truscon Steel Co., Youngstown, that all of the American officials and employees at its plant in Japan, between Tokio and Yokohama, are safe, following the earthquake. R. F. Moss, formerly of Detroit, is vice-president and managing director of the property, while F. W. Shackleton, formerly at the Youngstown plant, is works manager. Some damage was done to the Japanese plant, the extent of which has not been fully determined. It is the intention to make the necessary rehabilitation without delay.

Blowing in French Blast Furnaces

Method Generally in Use Before the War Described in Detail—Modifications Necessary Since the War Have Resulted in Large Economies

THE blowing in of a blast furnace is one of the most important matters connected with its operation, and may have an effect on the entire run of the furnace. Very little has been published recently on this detail of practice, and an account of the French method of starting a furnace will be of interest, particularly as it includes a discussion of principles which are applicable to furnaces everywhere. The article is by Maurice Derclaye in the *Revue de Metallurgie*, April, 1923, and a special feature is an account of how their pre-war practice has had to be changed because of after-war conditions.

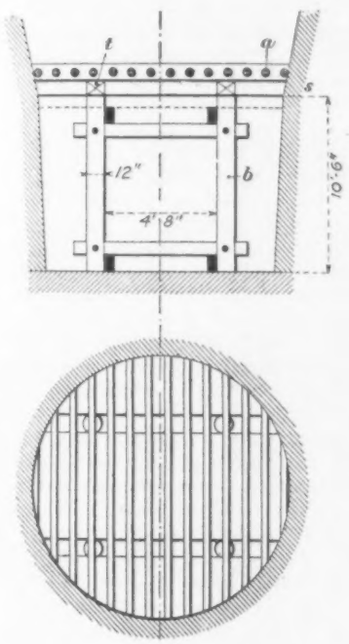


Fig. 1. (Left).—Construction of the Grate for Holding the Wood, Charcoal and Coke at the Beginning of the Bosh

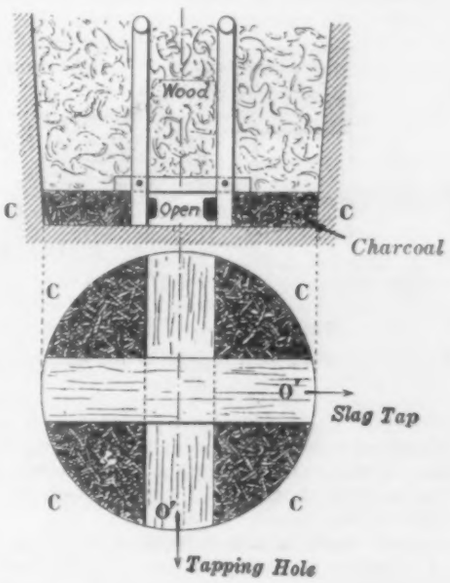


Fig. 2. (Right).—Method Used for Filling the Hearth Under the Grating

Pre-War Method

The method first described is that in general use in France before the war, and is taken up under separate headings.

Drying.—The volume of the refractory material of a modern blast furnace is considerable; for instance a French furnace of 11,720 cu. ft. capacity has 9040 cu. ft. of brickwork, which corresponds to 77 per cent. Such a mass of brickwork freshly erected requires careful drying to drive off its moisture and to heat it. Otherwise the moist brickwork may harmfully affect the development of the interior of the furnace; it may cause improperly heated materials to descend to the hearth and, above all, too sudden heating of the brickwork may cause bursting and scaling of the bricks, which means a short run. Even in the preliminary drying too much speed is harmful, and at least eight days are recommended.

Two small brick walls are built in the hearth of the furnace, about 2 ft. 6 in. high, and 5 ft. apart. On these are laid old rails to form a grate, and cut to fit the hearth. On this grate a fire of coke about 20 in. deep is kept burning day and night, and the ashes cleaned twice a day through the open tapping hole. The tuyeres and slag spouts are closed with walls made of half bricks, and the charging bell closed, only a small opening being left at the throat to give a light draft. When possible this method of drying is completed by introducing for one or two days a small amount of hot blast from an adjoining stove.

Wood, Charcoal, Coke and Wood Grate at the Beginning of the Bosh.—A wood grate at the beginning of the bosh is considered the best method for preparing to fill the furnace. It allows the complete charging of the furnace and prevents the charge pressing down on the materials for ignition, which are necessarily small in volume, and would be changed into a compact mass through which fire would have trouble in penetrating with the required regularity. Further the preparation of the hearth can be retarded until the last moment, which prevents premature firing. The disposition of the wood forms a kind of grating favorable to the uniform distribution of the air for combustion. The wood of the grating also furnishes a very inflammable material serving as a torch to fire the coke and to heat the walls of the hearth. The grating is constructed as shown in Fig. 1. Four round pillars of oak, about 12 in. diameter, are placed about 4 ft. 8 in. apart. They are tied together about 20 in. from top and bottom by two series of square supports. On top are placed two strong beams about 12 in. square, the ends shaped to fit the angle of the bosh. These beams are supported by two cross-pieces, "t." On these beams are placed rounds about 8 in. in diameter, and spaced about 8 in. apart, cut the proper length to form the circle.

On this grating is placed the wood for ignition, being well dried oak, cut in pieces about 4 ft. long and 3¼ in. square. The thickness of this bed of wood is to be about 4 ft. 4 in., and each successive layer should be laid cross-wise. The quantity of wood varies; 670 cu. ft. is sufficient for a furnace of 14,850 cu. ft. capacity. The quantity depends rather on the size of the hearth than on the internal capacity of the furnace. It is destined to fill the hearth with a combustible easily inflammable and of high calorific power so as rapidly to prepare the hearth for the first fused materials. A great deal of wood would be needed to meet this condition. A hearth of 350 cu. ft. capacity requires three or four tons of charcoal produced by 430 to 530 cu. ft. of hard

wood. This wood requires a large space in the furnace which can be used to better purpose. Therefore, part of the wood should be replaced with charcoal and, for large furnaces with hearths about 500 cu. ft. in capacity, in addition to the 670 cu. ft. of wood mentioned above about 2 tons of charcoal is placed on the wood, the thickness of the layer of charcoal being about 3 ft. 4 in. The total depth of wood and charcoal is then about 7 ft. 8 in.

In regard to coke for ignition Ledebur recommends 4 tons for each 3530 cu. ft. (100 cu. meters) of the interior volume of the furnace. Certain blast furnace men recommend 6 tons. Too much coke should not be used, and 5 tons per 100 cu. m. (3530 cu. ft.) has always been found a proper amount. In order to slag the ash of the coke, suitable additions must be made to give a slag fusible at relatively low temperatures. The importance of this first slag is considerable. It serves to heat the hearth and form a protective coating against the action of the iron. Also it is well to produce it during the first few hours of the run. Broken up blast furnace slag, made when the furnace was running with plenty of temperature, is a good base material. Considerable excess can be added without danger, as it

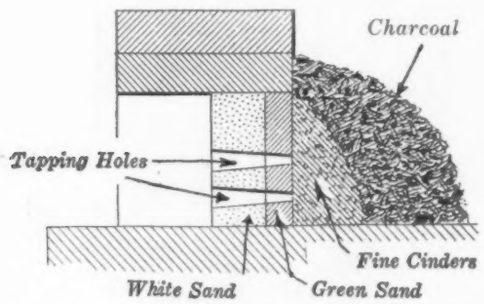


Fig. 3.—How the Preparation of the Tap Holes Is Provided for

melts slowly and dissolves the ash by filtering through the coke. It naturally contains a large excess of base ready to unite with the SiO_2 and Al_2O_3 forming the major part of the ash.

Limestone itself is not suitable for a flux at this time. A mixture of limestone and of good basic Bessemer slag can be used with success. M. Derclaye uses a flux equal to 8 to 10 per cent of the weight of coke and composed of two-thirds limestone and one-third crushed slag. This gives a very fusible slag with 32 to 33 per cent SiO_2, 41 to 42 per cent CaO and 20 to 21 per cent of Al_2O_3, with a lime over silica of 1.26 to 1.27. Slags richer in silica should not be used, notwithstanding the belief of many. Slags with 37 to 39 per cent SiO_2 are much too corrosive and easily attack the walls of the hearth.

Progressive Charges.—When making Bessemer iron the ratio between ore and flux on one side and coke on the other hardly ever exceeds 2.5. For basic Bessemer iron this ratio is usually about 3.0. The first charge generally has only 25 per cent of the normal ore and flux and gradually rises to 60 per cent in the upper layers. The change should not be too abrupt nor too slow. In regard to composition the slags produced should be fluid and non-corrosive. They should be capable of taking up silica or bases without too soon becoming infusible, and should remain fusible even if 10 per cent or more of the brickwork is dissolved. This result has been obtained by progressively increasing the basicity of the charges, starting with lime divided by silica = 1.35 for the first charges for Bessemer iron and attaining 1.45 in the upper layers.

In Bessemer iron slags this ratio is a maximum of 1.60, so this ratio must not be approached too closely. In the case of basic Bessemer iron where the maximum ratio is 1.40 the ratio to start with is 1.20, ending with 1.30 for the upper charges. These ratios apply to a furnace blown in with hot blast from neighboring stoves. When cold blast is used the ratios should be 1.20 to 1.35 for Bessemer iron, and 1.10 to 1.27 for basic Bessemer.

Many blast furnace men do not like to start a furnace with cold blast. Their fear is not justified, for there is no special difficulty in using cold blast. It is perfectly useless to install provisional gas producers to give gas to heat the stoves. The table shows the silica, lime and alumina found necessary to obtain fusible slags. By comparing the calculated slags with the table it is readily seen whether they will be fusible or not. When the slags are properly proportioned, one of the main factors for success has been obtained.

Table of Proportions of Silica, Lime and Alumina for Fusible Slags

Proportions of Al_2O_3	Cold Iron Min. Per Cent	Cold Iron Max. Per Cent	Hot Iron Min. Per Cent	Hot Iron Max. Per Cent
Al_2O_3 = 0.60 SiO_2				
SiO_2	38.75	35.58	32.41	29.24
Al_2O_3	23.25	21.35	19.45	17.54
CaO	28.00	34.74	41.48	48.22
Other materials	10.00	8.33	6.66	5.00
Al_2O_3 = 0.55 SiO_2				
SiO_2	39.91	36.67	33.44	30.20
Al_2O_3	21.84	20.01	18.28	16.50
CaO	28.00	34.77	41.53	48.30
Other materials	10.25	8.55	6.75	5.00
Al_2O_3 = 0.50 SiO_2				
SiO_2	41.07	37.77	34.66	31.16
Al_2O_3	20.43	18.77	17.12	15.46
CaO	28.00	34.79	41.39	48.38
Other materials	10.50	8.67	6.83	5.00
Al_2O_3 = 0.45 SiO_2				
SiO_2	42.23	38.86	35.49	32.12
Al_2O_3	19.02	17.49	15.95	14.42
CaO	28.00	34.82	41.64	48.46
Other materials	10.75	8.83	6.92	5.00
Al_2O_3 = 0.40 SiO_2				
SiO_2	43.39	39.85	36.51	33.07
Al_2O_3	17.61	16.30	14.80	13.39
CaO	28.00	34.85	41.69	48.54
Other materials	11.00	9.00	7.00	5.00
Al_2O_3 = 0.36 SiO_2				
SiO_2	44.55	41.04	37.53	34.02
Al_2O_3	16.23	14.94	13.64	12.35
CaO	28.06	34.87	41.75	48.62
Other materials	11.16	9.15	7.08	5.01
Al_2O_3 = 0.32 SiO_2				
SiO_2	45.68	42.11	39.57	35.94
Al_2O_3	14.82	13.65	11.32	10.27
CaO	28.00	34.90	41.85	48.78
Other materials	11.50	9.34	7.26	5.01
Al_2O_3 = 0.25 SiO_2				
SiO_2	48.00	44.30	40.60	36.90
Al_2O_3	12.00	11.08	10.15	9.23
CaO	28.00	34.96	41.91	48.78
Other materials	12.00	9.66	7.34	5.09

Labor of Charging.—The charging of the furnace should be done in dry weather as far as possible. The coke, ore, etc., should be dry. If possible they should be discharged and kept under cover. The coke should be chosen from the best available, lowest in ash, hardest and most regular in size. The unloading should be done carefully and the fines rigorously thrown away. Coke breeze stops the passage of gas, prevents regular descent of the charge, and any sudden drop due to hanging may cause insufficiently prepared material to drop into zones not yet properly heated.

Ore fines should also be carefully removed. All handling should be done with forks, and the ore, stone and fluxes should be broken to about fist size and fines rigorously rejected. The materials thus prepared should be carefully analyzed. The charges are raised to the throat and lowered into the furnace by means of a steam or electric hoist, discharged onto a steel plate and from this are shoveled by careful workmen into homogeneous horizontal layers.

A great deal of the success of blowing in depends on the charging. Direct charging as in normal operation should be avoided. The shock of the ore falling on the coke pulverizes it, and the effect is to give a column the whole height of the furnace. Derangements from this cause are corrected only slowly and with great difficulty in the early operation of the furnace. In order to have homogeneity and ore in good contact with fuel the charges are never so heavy as in regular

operation. The coke charges should never be more than two tons.

Preparation of the Hearth.—The filling of the hearth under the wooden grating is not done until the last minute. The slag hole and the tuyeres are put in place, but the latter are not connected with the bustle-pipe. Their openings are closed so as to avoid any accident, and the filling is carried out as shown in Fig. 2. On the hearth itself is built a box in the form of a cross, 20 in. high, one opening "O" in front of the tapping hole, the other or others in front of the slag holes. All over the bottom of the hearth is placed a thin layer, 2 in. to 2½ in. thick, of fine limestone screenings, so as to protect the hearth against the corrosive attack of the first slags. For the same reason a lining of fire bricks is built up around the hearth to the level of the tuyeres. The four corners "C" of Fig. 2 are filled with charcoal and the arms of the cross are stuffed with shavings. In order to form a roof and prevent the shavings being crushed tight, large planks are laid over the box.

The hearth is then filled with dry wood about 4 ft. 4 in. long and 2 in. thick, up to the grating, a space being saved in front of each tuyere which is filled with charcoal and shavings. The workman doing all this leaves by the opening always found above the tap hole. This hole is filled properly and everything is ready for starting.

Starting.—Lighting should be done at as many places around the circumference as possible. After having opened the tuyeres and connected them, gasoline is squirted through each one, through the tapping hole and the slag hole. Then fire is started in all the openings at once. It often happens that the fire seems to smolder in front of certain tuyeres. The best way to overcome this is to apply a gentle blast for two or three minutes. The effect is immediate and a clear flame soon shows at the throat. Natural draft is then used again.

Several hours after lighting little slips to right and left show that the oak columns are giving way. This takes place usually without noise, and frequent inspection at the tuyeres is necessary to observe it. Very soon after, coke is seen at the tuyeres, white hot, indicating that it is time to give a little blast, but before this the tapping hole must be closed and rings placed in the tuyeres to reduce the section.

Preparation of the Tap Hole.—Usually about 10 hr. after lighting, during which the tap hole is always open, the blast is applied with about 6 oz. pressure. Soon a flame appears at the tap hole like a blow pipe, heating it rapidly. After an hour of low blast pressure, the blast is raised for a half hour to about 30 oz., which cleans out all the dirt and prepares the hole for closing. The blast is then shut off. By means of a large rabble the hearth is cleaned about 20 in. back of the hole. A large basket of charcoal is then thrown in, then fine coke cinders, then green sand followed by white refractory sand rammed strongly into place (Fig. 3). Two triangular holes are then made with a special tool shown as in the sketch, one 2½ in. above the bottom and the other 6 in. above the first one. Fire clay rings are placed in the tuyeres, slightly over 3 in. internal diameter, to give more penetration to the blast. These rings can be readily broken and pushed into the furnace when not needed. All these preparations completed, the valves tested for the last time, assurance made that water is circulating properly in the tuyeres, etc., the blast is definitely put on.

Gas and Slags.—An apparently regular heating indicates that everything is going well. The stock descends in the furnace, and new charges are given with 60 to 65 per cent of the normal amount of ore. Twenty to twenty-four hours after putting on the blast the first slag is ready to tap, followed by another slag-tap one hour after. Many superintendents boast of tapping slag or iron within a short time after putting on blast. It is better to wait until the slag rises in the crucible, which is thereby heated and prepared for the first iron. When the second slag has been tapped, gas may be taken for the stoves. These should be taken care of before gas is taken for boilers or gas engines, but before doing anything the gas should burn at the throat with a clear, lively flame. This is usually the case after tapping slag twice.

This first gas contains a great deal of CO and care must be taken against explosions and gas-poisoning. The gas is taken slowly and methodically, the piping being swept out by sections. Finally full connection is made with the stove, and 10 to 15 min. are given to clean out the brickwork of the stove. There should be no hurry and it is better to give an extra five minutes rather than run the risk of an explosion.

The men should be kept away from the furnace top and the stoves. At the proper moment the blower together with a foreman lights the gas with burning tow or waste at the end of a bar, after having been sure there is draft through the stove. The first stove lighted, several minutes are given before the second is lit. It is rare that there is gas enough for a third stove.

The First Cast.—If it is best not to tap slag too soon it is still better to take time before tapping the iron. The first charges are low in metal and it takes at least 30 hr. before enough iron is concentrated in the hearth. Before tapping the spout and troughs are well dried with wood fires. Then half an hour before tapping a 1⅝-in. bar is driven through the lower of the two holes shown in Fig. 3, during this time it is allowed to heat in the iron. It is pulled out and the metal follows. Many times, however, there is a pasty mass on the bottom composed of fine ore, ash, stone, etc., and metal must be tapped from the upper hole.

This concludes the general remarks in the paper, and next comes a description in complete detail of the starting of six blast furnaces. The first three were with hot blast for making Bessemer iron. The next three were with cold blast for basic Bessemer iron and this is followed by the description furnished by another observer of another furnace which was not successful. Too little coke was used and too much limestone in the first slags, also no broken-up slag was used, and the gas was not used exclusively for the stoves. The furnace almost froze up, and made white iron and very limy dry slags. The author believes it is preferable to make first a white iron in ordinary practice for a short time, as the brickwork thereby is less attacked, and takes on more rapidly its usual protective coating.

After-War Modifications

The paper concludes with a description of the methods found necessary to meet the after-war conditions of shortage and expense of labor, and also the desire to shorten the preliminary time when no iron is produced. The preparation of the wood-grating, which characterizes the old method, is expensive, and more expensive still is the cost of hand filling, because it requires 20 men each shift of 12 hr. for eight to ten days. This is four times the labor needed for ordinary running. In addition the old method takes about 10 hr. from lighting before the blast is put on, putting gas to the stoves in 24 hr., and the first cast in 29 hr. About 11 days elapse from the first preparations until the first cast. Efforts have been made to reduce this time, and do away with hand filling.

The hearth is filled with large faggots well dried, to a level about three feet above the tuyeres, introducing the faggots from below. Then, the tuyere openings and tapping hole being carefully bricked up, the lighting coke and filling charges are charged in the usual way with the ordinary labor. No charging is done at night, so as to have the operation under good control, and the night men used on the other preparatory work necessary. Two days are enough to charge the furnace.

The principles outlined before are all carefully respected, such as the amount of lighting coke, gradation of iron in the charges, importance of the first slags, etc. Blast is given immediately after lighting, which is necessary because the wood burns quickly. Also to help in its combusion a tuyere is placed in the tapping hole, and left there for two or three hours.

Four furnaces put in blast since the armistice were handled in this way with complete success. Three hours after being lit the tap hole was closed, and seven hours

after gas was lit in the stoves. Twenty to twenty-four hours after, slag was tapped, and 22 to 24 hr. after lighting, iron was tapped. The elapsed time from the first preparations to tapping was three days instead of eleven. The fifth day 100 tons was made and in 10 to 12 days the furnace was in normal production, without the upper brickwork or the top having been in any danger. G. B. W.

Time Study in a Malleable Foundry

Factors Taken into Consideration Summarized—How It Is Applied in Actual Practice

BY MARTIN A. HARDER*

THE main object of time study is to determine the time for a task. There are, however, other advantages, such as the determination of possible improvements in the equipment, and elimination of all unnecessary operations, which means in itself less fatigue to a molder and therefore greater production.

Time study procedure entails certain basic investigations which are essential before the data collected can be made use of in rate selling. There should be made: first, a careful survey of the work and all influencing conditions; second, an analytical division of the task into simple elements; third, an observation and record of the time taken in performing each of the element operations; fourth, a study of the recorded unit times. To make use of the data collected for rate setting all abnormal readings should be discarded and a fair standard time determined for each one of the simple operations. To illustrate this, there are 25 different operations in molding a job on a squeezer, in sequence as follows: place match on machine, set drag on match, parting sand, riddle, shovel, pein, set board, squeeze, remove match, place cope, parting sand, riddle, shovel, pein, set board, squeeze, remove board, cut sprue, remove cope, rap pattern, remove pattern, place cores, place cope, remove flask, place mold on floor.

Now to take an observation in the ordinary way it would be necessary to time the actual making of at least three molds, analyzed as above, and the minimum time taken for each operation would then be totaled up, plus the usual allowance for fatigue, pouring, and whatever else would enter into it, and this then would be the basis for figuring the piece rate. The question might arise, what type of man would be used for a study? This is where the standard time on each operation enters into it, for if this were not the case the piece rates would be as much out of line as there are differences in the abilities of molders.

Of the 25 various operations there are only four which may be classified as being variables, namely, setting chills, rapping pattern, removing pattern and placing cores, that is, for flasks from 9 x 13 x 8 in. to 14 x 14 x 8 in., inclusive; the other operations within these limits are all standardized, which means that, in the majority of cases, it would only be necessary to time the four variables. However, it is advisable to take a study upon a complete mold, in order to see if anything interferes with the standard time.

Standards for each operation were arrived at in the following manner by one who has spent several years at this class of work, and made a special study to determine constants that could be used as standards. A good many observations were taken during the course of several months on men of average ability on flasks ranging in size as stated. The observations were next taken and analyzed for every operation, and an average taken which was afterward used as a standard, and has since proved to work out very satisfactorily.

A comparison of standards was made with other plants in Chicago and it was found that there was only 3 seconds difference in the total time allowed for making a mold on the squeezer.

The pouring time is figured somewhat differently; usually an hour is allowed for each heat and this time is figured in with the molding price. The weight of the castings or the number of ladles of iron carried is taken care of by the percentage of fatigue allowed.

Example: Total time taken to make mold is 3.55 min. Add 25 per cent to total time taken to make a mold, for fatigue, which equals 0.89 min., making 4.44 min., the total time allowed for making mold.

Ten hours are allowed for one full working day, of which 8 hr. are allowed for molding and 2 hr. for pouring. Reduce the molding hours to minutes, which equals 480 min. Divide the molding hours, or 480 min., by the total time allowed per mold, or 4.44 min., which is 108, or the production of molds per 10-hr. day, which includes the pouring time. The molder's base rate is 55c. per hour. To this add 33⅓ per cent, making 73c., or the high rate; in other words, the amount the molder is expected to earn per hour.

At the rate of 73c. per hr. the molder will be expected to earn $7.30 per 10-hr. work, including pouring. Divide $7.30 by the production per day, or 108 molds; this gives $6.75, which is the molding price per 100 molds.

Twenty-five per cent fatigue is allowed on all jobs where four or more molds are poured with one ladle, 30 per cent fatigue on jobs where three and four molds are poured with a ladle, and 35 per cent fatigue on all jobs when only one or two molds are poured with one ladle.

*Wisconsin Malleable Iron Co., Milwaukee. Paper prepared for convention of Wisconsin Foundrymen's Association.

Officials of the Pacific Steel Corporation, San Francisco, have formed the Pacific Coke & Coal Co., under Delaware laws, with capital of $7,500,000, to carry out its proposed project at Long Beach, Cal., where a site has been selected between the Long Beach and Los Angeles harbors. It is purposed to construct a blast furnace with initial capacity of 600 tons of pig iron per day, with a battery of 50 by-product coke ovens. Later a steel works may be built on an adjoining site.

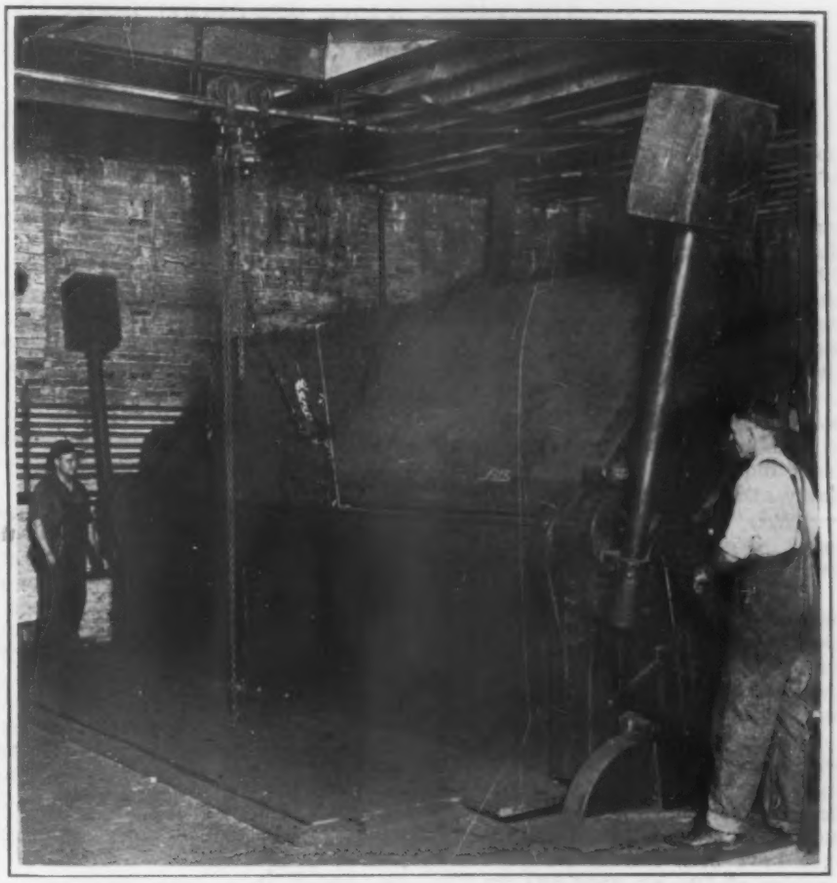
The Interstate Commerce Commission has suspended a tariff of the Illinois Central Railroad which provided an allowance of $1.25 per car to be paid to the St. Louis Coke & Iron Co., Granite City, Ill., on all carload line haul shipments going to or coming from the plant of the company where the industry performs a specific switching service between points of interchange with carriers and locations within the plant. The tariff had been filed to become effective Sept. 12.

The Acme Steel Goods Co., Chicago, is completing a new cold-rolled strip mill at Riverdale, a Chicago suburb, which will increase its cold rolling capacity to 56 mills, with an annual output of 50,000 tons. The mill is expected to come into production on or before Nov. 1. The mill adjoins the hot-rolling mill which the company built at Riverdale in 1919.

The Carnegie Steel Co. has prepared plans for a coke handling plant at its Mingo, Ohio, works. The company proposes, with the completion of the addition to its Clairton, Pa., by-product coke plant, to supply the coke requirements of the Mingo furnaces from Clairton and to convey the shipments by water.

Large Steel Bending Brake

What is believed to be the largest steel bending brake in this country was recently installed at the plant of the O. H. Hill Co., Chicago, manufacturer of metal doors and windows and heavy boiler plate work. The brake, which was built by the Dreis & Krump Mfg. Co., Chicago, has a capacity to bend ¾-in. steel plate 16 ft. long. It is built from 2-in. steel plates 60 in. wide and rests on a concrete foundation extending 2 ft. below the floor level. It is operated by a 35-hp. motor and weighs 30 tons. The massive character of the machine is indicated by the fact that the two balance weights shown in the photograph weigh 1700 lb. each. There are a number of other large brakes in use but none of them is believed to be as large as this one. The Newport News Shipbuilding & Drydock Co. has a 12-ft. power brake for ¾-in. plate. The Ford Motor Co., Detroit, has a 12-ft. brake for ⅝-in. plate, and the Boyle Mfg. Co., Los Angeles, a 14-ft. brake for ⅜-in. material.



Steel Bending Brake in the Plant of the O. H. Hill Co., Chicago, Capable of Bending ¾-In. Steel Plates 16 Ft. Long

Oxygenated Air in Metallurgy of Ferromanganese*

The field of ferroalloys is one of particular promise in the application of oxygen to combustion. So far, only a few of the ferroalloys respond to blast furnace reduction because of the inability to supply the high temperature heat required in this type of furnace. For this reason, electric furnace processes have been necessary for the industrial production of all but three of the common alloys, and as is true with all electric furnace processes, the cost of production is very high. Inasmuch as ferromanganese is one of the most common alloys made in the blast furnace, we have made a study of this process as it exists, and further investigations as to the results to be expected with the application of a blast enriched with oxygen.

[The original report contains here a discussion of general conditions with data on heat distribution and material balance.]

One of the most favorable studies developed calls for a blast of 26.3 per cent of oxygen (by weight) heated in stoves to 1135 deg. as in the regular practice shown, and an increase in burden of 75 per cent. In this practice, in order to conserve shaft heat, calcined limestone must be charged.

To form a comparison of manufacturing costs of the proposed process with that in use today we have prepared the following cost estimates based for the greater part on actual operating costs, charging oxygen at a rate of $3.00 per ton, for we have been assured that for large commercial production the cost of oxygen will hardly exceed this figure:

Table of Comparison of Making Ferromanganese with Air and Oxygenated Air

Blast Used	Air			26.3% O_2 Blast		
	Per Ton Fe-Mn	Cost per Ton Material	Cost per Ton, Fe-Mn	Per Ton Fe-Mn	Cost per Ton, Material	Cost per Ton Fe-Mn
Manganese ore...	6,169	$18.00	$49.572	6,165	$16.70	$45.962
Coke	6,707	10.00	33.535	3,829	10.00	19.145
Limestone	2,548	1.25	1.421	1,259	4.00 (calcined)	2.249
Labor:						
Superintendent, fireman, etc...			0.142			0.081
Stocking			0.029			0.029
Charging			0.317			0.317
Casting			0.758			0.432
Other producing labor.....			0.027			0.015
Repairs and supplies.....			1.378			0.785
Steam			0.012			0.007
Blowing			1.169			0.475
Water			0.269			0.154
Hydraulic and pneumatic power			0.027			0.015
Electric light and power.....			0.046			0.026
Yard switching.....			0.291			0.291
Handling material (raw).....			0.593			0.593
Chemical laboratory.....			0.069			0.069
General works.....			0.132			0.075
Safety welfare.....			0.019			0.011
Contingent fund.....			0.030			0.017
Relining fund.....			3.000			1.714
Oxygen			.....	203	3.00	0.272
Gross total cost.....			$92.836			$72.734
Credit for surplus gas, 345,000 cu. ft. @ $0.032 per 1000...			11.04	164,000 cu. ft @ $0.038 per 1000		6.23
			$81.796			$66.504
					Saving per ton,	15.292
						18.7%
Daily production 60 tons ferromanganese.				105.5 tons ferromanganese, 75.8 per cent increase.		

Ferromanganese is one of a large group of ferroalloys, and this study is shown not only as one on ferromanganese itself, but as an example of probable processes for coke furnace manufacture of other and more difficultly reducible alloys.

*Extract from an extensive report by a special committee of the Bureau of Mines, organized to investigate the use of oxygen or oxygenated air in metallurgical and allied processes. It includes the blast furnace, Bessemer and open-hearth, ferromanganese and artificial gas. The chairman of the committee is M. H. Roberts, consulting mechanical engineer, Bureau of Mines. The author of the report is F. W. Davis, metallurgist, Bureau of Mines, Minneapolis, Minn. The portion on blast furnace was published in THE IRON AGE Sept. 13; that on the open-hearth and Bessemer elsewhere in this issue.

One Month's Progress in Reducing Hours

Introduction of the Shorter Day Attended by Many Difficulties, Which Are Slowly Being Overcome —The Case of the Ten-Hour Workmen

PITTSBURGH, Sept. 17.—A few days after the announcement of the adjustment in the wages of the 10-hr. workmen, whereby such men receive 11 hr. pay for 10 hr. work, the labor boss at one of the Pittsburgh district plants was approached by one of the dark-skinned men, who was still among those working 10 hr. a day. Incidentally this adjustment means that such labor now gets 44c. per hr., or $4.40 per day of 10 hr. As an example of the reaction of the men of this class to the change the conversation between the colored man and the labor boss is interesting.

"Boss," said the workman, "you do not expect us to work for 20c. an hour?"

The boss, having in mind the new rate of 44c. an hour, did not instantly catch the drift of the negro's query and asked just what the latter meant.

"Well," said the dusky worker, "the fellows working 8 hr. get $4 and we get $4.40 for 10 hr., 40c. for two hours, or 20c. an hour."

If this was an exceptional case, its citation would be uncalled for, but it is a fact that in the Pittsburgh district steel plants and in those in adjacent districts, one of the most troublesome problems connected with the abolishment of the 12-hr. day has been to keep the men working longer than 8 hr. entirely satisfied.

It has been difficult even at blast furnace plants where the three 8-hr. shift system has been inaugurated to put all of the men on an 8-hr. day, chiefly because there have not been enough men. This statement calls for some amplification. Men in large numbers have been attracted to the steel plants by the promise of 50c. an hour and an 8-hr. day, but it is the experience of the plant managers in this and nearby districts that the quality of the labor applying for work has averaged pretty low and the percentage of acceptances has been all out of proportion to the number of applicants.

Chance for Garden Work Needed

The 8-hr. day has long been the common working period in iron and steel plants in Europe, and those conversant with conditions across the water say that a longer day would be difficult to establish since the shorter day permits the workmen ample time for the cultivation of small truck gardens, located near their homes and not far away from the plants. Less difficulty as to wage adjustments would be experienced, it is asserted, in putting in the shorter workday in American plants if the workmen, not a few of whom are from the agrarian districts of Europe and would welcome a chance to work a small patch of ground in spare time, were given an opportunity to do so.

It is somewhat difficult to arrive at a definite estimate as to the extent of the application of the shorter day since it was inaugurated about a month ago in this and adjacent steel-making centers. With the Steel Corporation subsidiaries it was a case of going right ahead with the idea and a determined effort to surmount all obstacles in the path. With the independent companies it has been a case of experimenting first and applying the change afterward. Steel Corporation plants, consequently, are further along in the application of the change than are the independent companies. Independent companies in the Youngstown district made the move practically coincident with the Steel Corporation, but, locally, only the Pittsburgh Crucible Steel Co. and the Pittsburgh Steel Co. have made formal announcement of the adoption of the shorter day and, starting later than did the Steel Corporation subsidiaries, they are not yet very far along with the plan. The Wheeling Steel Corporation started the change of working schedules a week or so after the Steel Corporation, but has been moving cautiously, giving due attention to the course of other companies having plants in the same localities in which it has plants.

In the Pittsburgh-Wheeling-Youngstown district a careful casting up of estimates made by the different companies would indicate that about half of the total number of men formerly engaged on the longer turn now are working 8-hr. turns. The change worked much faster at its inception than it has during the past two weeks. This is explained by the fact that large numbers of men who previously found employment in other walks were attracted to the mills by the comparatively high rate of wages and the short workday. But it was soon found that the average ability of the men seeking the jobs created by the change was very low, and in the past two weeks progress in extending the shorter day in the continuous process departments has been largely arrested while the inefficient men are being culled out. It has been the experience of several plant managers here that the negroes, who have been coming to the North from Southern plantations in large numbers, have not included many efficient workmen. The Mexicans and some Spaniards who have come in through Mexico have proved much more satisfactory in filling up the gaps created by the setting up of the extra turn.

The Plan for Three Shifts

The most common plan followed in setting up the three-shift system has been to start the first turn at 7 a. m., the second at 3 p. m. and the third at 11 p. m. This has been the scheme in blast furnaces, coke plant and open-hearth furnace plants, and was designed primarily to overcome the ending and starting periods at inconvenient hours. With the night turn starting at 11 p. m., men finishing a turn at that hour could reach their homes and beds without long waits for street cars or disturbing their families who might be asleep, and it worked no hardship for the men reporting for work at that hour. In the sheet and tin plate mills the plan has called for the first turn men to start at 8 a. m., while the plan as devised by the National Tube Co. called for the working of seven 8-hr. turns and 24 hr. layoff every seven days. The latter plan, designed to preserve the 6-day week, of course meant that at least a portion of the men appeared twice on one day of each week, and had merely an 8-hr. layoff on that day.

Progressing More Slowly

While the plan of establishing the shorter day in the industry has worked out much more rapidly than many expected, it must not be supposed that it is yet anywhere near 100 per cent in this and nearby districts. And as has been previously stated, it has been a slower process in the past fortnight than it was in the first two weeks of the effort. It has been necessary to promote men and to find men to fill the vacancies thus created. The men in new jobs have had to be coached by older men and the new men taken on have had to be instructed and at the same time tried out as to their capabilities. As an official of one of the Steel Corporation plants expresses it, "the change thus far has meant very hard work for the older men, who have been doing the work, while the new men have been looking on."

As to the actual number of men required in the

creation of the extra turn, the experience of different plants has varied. In some instances it has involved the employment of a full extra crew, or a 33 1/3 per cent increase, but on the other hand, there have been cases where only a few extra men were necessary since the duties of each man were increased and the crew numbers correspondingly reduced. On an average, however, it is estimated that about 20 per cent more men are necessary under the new than under the old arrangement.

Many Plants in Central Pennsylvania Changed

MARYSVILLE, PA., Sept. 17.—All iron and steel plants of any size in Harrisburg, Pa., and immediate territory, are now operating on the 8-hr. day basis. The Steelton, Pa., plant of the Bethlehem Steel Co., the largest of these, will require a total of 500 men to make the change satisfactorily, while the Central Iron & Steel Co. is operating on 8-hr. days without additional help.

The change of the last workmen at Steelton to the 8-hr. day was accomplished at Steelton during the past week, the change having required about three weeks for completion. Not all of the 500 men needed have been secured, but enough have been added to make the change from the long day satisfactorily without sending out employment agents for negroes and Mexicans, although some men of these classes, usually relatives or friends of men already employed, have been added. Most of the new workmen, according to plant officials, have been Americans, men coming from mines and other mills.

The Steelton plant maintains a labor camp, composed of concrete huts, for these men. This was established during the war, and was abandoned during the subsequent slump, but there are now about 700 negroes, Mexicans and Portuguese living there.

The change to the 8-hr. day has involved the transfer of efficient workers from one department to another in some cases in the extra shift where skilled men were needed. Few skilled workers have been found among the new men, most being laborers. Few of the men living in the labor camps, the negroes, Mexicans and Portuguese, get beyond the labor class, although in isolated instances some become mechanics' helpers. The foreigners from Central Europe who have been added are showing encouraging progress, while most of the Americans added to the forces adapt themselves easily to their new work.

Workmen generally have been entirely satisfied where they receive as much money under the new scheme as under the longer tricks. In cases where they receive less there has been some slight dissatisfaction, although not of alarming proportions.

Pleased with the Change in Southern Ohio and Northern Kentucky

CINCINNATI, Sept. 17.—Much progress has already been made in the installation of the 8-hr. day at steel plants and blast furnaces in the southern Ohio and northern Kentucky district. One month after the time when this movement was really started, Aug. 16, by the larger producers of iron and steel, finds six merchant furnaces in this district on three shifts, with the remaining furnaces preparing to put the new order into effect in the shortest possible time.

The steel plants of the district have been working on three shifts for some time past; in fact, two of these, the Andrews Steel Co. at Newport, Ky., and the Middletown works of the American Rolling Mill Co., were the pioneers in this movement. Other plants have followed the lead until today, in the steel industry in this district, there are only a few spots where longer shifts than 8 hr. are worked, and it is almost a certainty that by the first of the year, at the very outside, all plants will be organized on an 8-hr. basis.

The change from the 12-hr. day to the shorter shift has been accomplished without any complications. The experience of the Jackson County silvery furnaces may be taken as typical of the new order. These three furnaces, Globe, Star and Milton, each put the 8-hr. day into effect on Aug. 23. The change has been working exceptionally well, according to the executives of the companies. The shifts worked are from six to two, two to ten, and ten to six. Very few extra men were required to operate the furnaces under the new arrangement, and no material change in the output was noticed. The question of wages was naturally of some moment, but this was solved satisfactorily both to the men and management. The 12-hr. men, when put on the 8-hr. turn, gracefully accepted a 10 per cent reduction in their total earnings, but what this really means is a 35 per cent advance in their hourly rate. Practically all of the men employed at these furnaces are native-born Americans, and welcome the change from the long shift to the short one, as giving them much extra time to themselves to be used in improving their properties—as many of them own their own homes—or in other ways that may suit their individual cases. Speaking of the change, the executive of one of the furnaces said that it was working out beautifully, and he expressed the conviction that never again would the blast furnaces of the Jackson County district be operated by men working longer than 8 hr. at a time.

The furnace of the Milton Iron Co. at Wellston has been operating on the 8-hr. plan for some months, and conditions there are entirely satisfactory to the men and management. Where necessary, of course, some overtime is worked, but all efforts of the management and employees are bent to adhere strictly to the three-shift plan.

In the Ironton district the Marting Iron & Steel Co. and the Hanging Rock Iron Co. have changed over to the 8-hr. shift, and the change is working out very satisfactorily. Only a few extra men were needed, and these were available without the necessity of importing workmen from outside points. Other furnaces in the district are working out plans for the substitution of the shorter day, and when these plants start it will be on a three-shift basis.

At Ashland the rolling mills of the American Rolling Mill Co. are operating on the 8-hr. turn, and the change from the longer shift to the shorter one will be made in the blast furnace department about Oct. 1, according to present plans. This also applies to the blast furnaces of the company at Columbus. At Portsmouth the same condition exists, and it is probable that Oct. 1 will see the 8-hr. day installed at the blast furnace department.

The coke oven plants in the district are also working out plans to put the three-shift plan into operation at the earliest possible moment. The consummation of these plans, it is said, has been handicapped by a shortage of labor, but it is expected that this condition will be overcome very shortly, as more men become available from the ranks of those now employed at seasonable activities.

Reviewing the situation, it may be said that the 8-hr. turn is firmly established at those merchant furnaces now in operation, and will be shortly established at the steel works furnaces. All the rolling mills in the district are now on the three-shift basis. Those furnaces which are now out of blast will, when they resume operations, be put on an 8-hr. basis, so that it is confidently expected that by the first of the year the long shift in the steel and allied industries will have become but a memory. General satisfaction is ex-

(*Continued on page* 772)

BUSY ALONG THE OHIO

Conditions in Southern Ohio and Northern Kentucky—Furnace Activity May Increase

IRONTON, OHIO, Sept. 17.—The summer season has been a busy one in Ironton and vicinity, and no pessimism is apparent, judging from reports of the operators of the various blast furnaces, steel plants and wire and nail mills located in the southern Ohio and northern Kentucky district.

While only two blast furnaces are operating at Ironton, the Etna stack of the Marting Iron & Steel Co., at Ironton, and the Hamilton furnace of the Hanging Rock Iron Co., at Hanging Rock, it is expected that two more will be in blast shortly after Oct. 1. The Belfont Iron Works Co. is now installing a pig machine at its Belfont furnace, and it is likely that the furnace will blow in for a run on Bessemer iron about Oct. 15, when the installation will be completed. It is also expected that Sarah furnace of the Kelly Nail & Iron Co. will go in about the same time. This furnace has been extensively altered during the summer, and with the changes made, it will be able to considerably increase its output of iron.

Blast Furnace Resumes

At Ashland, No. 2 Ashland furnace of the American Rolling Mill Co. has resumed operations after having been shut down for repairs. This furnace is making basic iron. The steel plant is operating at about 65 per cent of capacity. Construction work on the new rolling mills is well advanced, and machinery is now being installed. It is expected that operations will be commenced in this plant some time in November. Norton furnace at Ashland is out of blast, but it is not at all an impossibility that it will blow shortly. The plant of the Norton Iron Works Co. is running well on nails and wire products.

Globe furnace at Jackson is the only silvery furnace at present in operation, Star having blown out some time ago, and Jisco furnace is down for relining. It is expected that Jisco furnace will be put back in operation within the next three or four weeks. At Wellston the Milton furnace has been out of blast for some time, and Wellston No. 1 is scheduled to go out this week.

At Portsmouth the furnace of the Whitaker-Glessner Co. is operating on basic, while at Columbus, one furnace of the American Rolling Mill Co. is still in blast. The furnace of the Hamilton Iron Co. has been out of blast for several weeks.

Production and Shipments

While some of the furnaces now operating have iron piled on the yards, they are now about balancing production with shipments, so that a substantial buying movement, which it is hoped will develop, would clear up the larger part of the yard stocks.

Coke plants in the district continue to operate full time, but no effort is being made to push production.

At Newport, Ky., the plants of the Andrews Steel Co. and the Newport Rolling Mill Co. are both operating at practically full capacity. Extensive improvements have been completed at the blooming and bar mills of the Andrews Steel Co., which enables the company to better take care of its customers for sheet bars and billets, as well as keeping the sheet mills well supplied with materials.

Merchant blast furnaces in the Ironton district are now using the Ohio River in shipping their products to their customers. While most of this iron is being shipped to up-the-river points in Ohio and West Virginia, several barge loads have been sent down the river as far as Louisville. With the installation of the unloading facilities planned at Cincinnati, it is expected that shipments of pig iron from the Ironton district by river barges will soon catch up with the shipments handled by the railroads, as a considerable saving in freight charges can be made by using the river method of transportation.

EMPLOYMENT INCREASES

Slight Improvement in August as Compared with Conditions in July

WASHINGTON, Sept. 18.—Employment in iron and steel and their products showed the slight increase of 0.7 per cent in August when compared with July, according to the Department of Labor through its Employment Service. An increase of 0.68 per cent was shown in railroad repair shops. A decline of 1.4 per cent was made in metal and metal products other than iron and steel. Of the 14 basic industries reporting, the greatest increase, which amounted to 8.6 per cent, was made in stone, clay and glass products.

In the 1428 establishments involved in the analysis, a decrease in employment was revealed in August amounting to 9366 or 0.5 per cent. This decline was anticipated in employment circles, as July and August are regarded as the months in which a slackening in industry may be expected. The report adds:

"One of the features of this month's report is the continuation of the tremendous building programs in nearly all of the larger centers throughout the country. In very few sections is any abatement noticeable, and vast numbers of building tradesmen and common labor are at work on projects of sufficient magnitude to insure permanent employment for some time to come.

"Activity continues with no signs of a let-up on the construction of State and county highways. Large numbers of both skilled and unskilled labor are employed on this work, and in some sections there is a demand for this class of laborer which is not being met. The shortage of men which had been confronting the farmers for the past few months shows some signs of easing up. There is still a persistent demand, however, and in some sections the call for farm help far exceeds the available supply.

"Generally speaking, industrial employment in this country today is on a satisfactory and sound basis, and the outlook for the future is one of the brightest in recent years."

Coke Production Reduced

WASHINGTON, Sept. 18.—The production of by-product coke declined slightly during August, says the Geological Survey. The total output is estimated at 3,239,000 net tons, a decrease of 28,000 tons from the revised figure for July. Reports from all plants now in existence show that 65 were active and five were idle. The output from active plants in August was 86.5 per cent of the total capacity of all plants. The production of beehive coke continued on the decline during August and the output was 1,494,000 tons against 1,582,000 tons in July. The rate of production, although in excess of the monthly average of 1921 and 1922, was less than during the more normal years 1917 to 1920. Production of soft coal during the week of Sept. 10-15, is estimated at between 11,000,000 and 11,300,000 tons.

A wall chart for the tool room is being prepared by the Independent Pneumatic Tube Co., Chicago, to cover the various interchangeable repair parts of the Thor electric drill. In the form of a wall-hanger, it is expected that this chart will prove of considerable convenience to users of the drill.

F. E. Schuchman, general manager Homestead Valve Mfg. Co., Homestead, Pa., will address members of the Pittsburgh Foundrymen's Association on, "Industrial Management—Some Points of Application to Daily Problems," at the monthly meeting to be held Monday evening, Sept. 24, at the General Forbes Hotel.

Nickel Steel Direct From the Ore

Use of Canadian and Cuban Ores—The Waste Involved—Presence of Copper—Use of the Electric Furnace

BY F. H. MASON*

IN the year 1914 approximately 300,000 tons of sulphur was ejected into the air, poisoning the atmosphere and rendering waste a large area of arable land, and 400,000 tons of iron was sloughed off and wasted as slag in the recovery of 22,700 tons of nickel and 14,400 tons of copper from the nickel-copper ores of Sudbury, Ontario. The foregoing estimate was contained in a report by Alfred Stansfield, professor of metallurgy at McGill University, to the Royal Ontario Nickel Commission. The waste is the more appalling when it is remembered that at that time 70 per cent of the nickel recovered was subsequently alloyed with steel produced from iron ores from other parts of the world.

The Canadian Ores

Palpably, then, if nickel and iron could be recovered together from the Sudbury ores, an enormous saving would be made and if at the same time the sulphur could be utilized the natural resources of Canada would be that much to the good. Nor would the economy end there. The roasting operation, though done by natural combustion in heaps, entails a good deal of labor and the slagging of the iron necessitates, besides a large amount of labor in disposing of the slag, the addition of a quantity of silica to flux the iron oxide.

Sudbury nickel-copper ore is a massive pyrrhotite together with varying quantities of greenstone and quartzose gangue through which is disseminated several nickel minerals, principally pentlandite and chalcopyrite. Typical ores will run from 2 to 4 per cent nickel, 1 to 2 per cent copper, 20 to 30 per cent sulphur, 25 to 40 per cent iron, and 5 to 15 per cent gangue, the ore varying markedly with the mine from which it is obtained. The ore contains also small amounts of gold and silver and a number of the metals of the platinum group. These precious metals are distributed very unevenly.

The Waste Involved in Some Methods

A brief outline of the preliminary method used for the recovery of the nickel and copper is necessary to illustrate the appalling waste in the operation. The ore is piled in heaps of about 60 by 100 ft. by 8 ft. high, several cords of wood forming the bottom layer of the center of each heap; the lump ore is placed at the bottom and the fine on the top; a channel, to provide draught, connects the center of the heap with the outside. The fire is started, and the wood burns for about two and a half days, by which time the combustion of the sulphur in the ore has been thoroughly started. The combustion continues for three or four months, by the end of which time the sulphur content has been reduced to 9 or 10 per cent and the ore has become so agglomerated that it requires to be blasted to break it up.

The roasted ore is charged into rectangular blast furnaces, ranging from 50 by 204 ft. to 50 by 306 ft. in section and 19 ft. high, with 12 per cent of coke and varying proportions of quartzose ore, or quartz, to flux the oxide of iron. The matter from this operation, containing about 30 per cent of mixed nickel and copper, is conveyed by ladles to Bessemer converters where, with frequent additions of quartz, it is blown to a matte containing about 80 per cent of mixed nickel and copper and 3 to 4 per cent iron. The separation of the nickel and copper in this matte is carried out by different processes at the several refineries, processes with which this article has no concern, the foregoing outline being given purely to show the enormous waste of iron and sulphur in the operations.

Use of the Electric Furnace

This waste was recognized by Eugene Haanel, at that time director of the mines branch of the Canadian Department of Mines, toward the end of last and the beginning of this century, and a series of experiments were made with a view to producing a nickeliferous pig iron directly from the Sudbury ore. These experiments gave so much promise that the Lake Superior Power Co. purchased the Gertrude mine and, in 1902, erected a small electric furnace at Sault Ste. Marie.

The ore from the Gertrude mine was thought to be particularly suited for the purpose, as it had a high nickel and low copper content, the latter metal at that time being considered to be particularly injurious in steel. Sault Ste. Marie was chosen as a site for the operations, because it was convenient to Sudbury and the sulphurous vapors evolved during the roasting of the ore could be used in the manufacture of sulphite wood pulp. The work was carried out under the direction of the late E. J. Sjostedt, Doctor Haanel acting in an advisory capacity.

The ore used was specially selected, with a view to keeping the copper content as low as possible. It was crushed and roasted, and the roasted product had the following average analysis: Iron, 45.8; nickel, 2.23; copper, 0.41; and sulphur, 1.56 per cent. The furnace charge consisted of roasted ore, 2000 lb.; limestone, 1500 lb.; charcoal, 1200 lb.; electrodes, 40 lb., and electrical horse-power-years 0.46. The resulting pig had the following average analysis: Nickel, 4.0; copper, 0.8; sulphur, 0.01; and phosphorus, 0.03 per cent.

With the furnace operating at the rate of about one and one-third tons per day, Sjostedt turned out 168 tons of nickeliferous pig. This metal was sent to different parts of the world for experimental purposes; some was converted into steel in the United States and some in Europe. The resulting steel was found, it is said, to be fully equal to nickel steel, manufactured by alloying nickel with steel in the usual way, but engineers had such a deeply rooted objection to the presence of copper in steel that it was practically impossible to induce them to specify the metal for structural work.

For many years G. M. Calvocoresses carried out experiments along similar lines in the laboratory at Columbia University and in other places, and in 1918 he endeavored to form a company for the purpose of making what he called "nicu" steel from Sudbury ores by nodulizing the roasted ore and smelting it in blast furnaces and converting the resulting pig into steel in open-hearth furnaces—a perfectly feasible plan, as subsequent events have demonstrated. Calvocoresses, however, ran against the same obstacle that had halted Sjostedt—copper.

The Presence of Copper

Of recent years engineers have moderated their views on this point to some extent but, despite numerous tests clearly proving that a moderate proportion of copper is not injurious to nickel steel, a number of steel manufacturers still retain the prejudice against copper in steel while many engineers bar such metal in their specifications. It is the old tale of giving a dog a bad name ever repeating itself.

It might be well to point out here that the main

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objection to copper in steel is that the copper does not alloy readily with iron and, consequently, tends to separate on cooling, rendering the metal "cold short." Nickel, on the other hand, alloys in nearly all proportions with both iron and copper; consequently, when nickel and copper are both added to iron, the nickel holds the copper in solution and prevents segregation.

Still, until this fact becomes recognized by the engineering profession, it is useless to try to force a nickel steel with a high copper content on the market. If, then, a nickel steel acceptable to engineers is to be made from Sudbury ores it is evident that most of the copper must be removed before the ore is melted. How is this to be done?

A hint, it is suggested, may be obtained from experiments that have been made on the gold-copper ores found at Rossland, in British Columbia. These ores bear a strong resemblance to the Sudbury ores, but contain only a trace of nickel. The ore is a massive pyrrhotite through which is disseminated a small proportion of chalcopyrite, the gold being associated with the latter mineral. The Consolidated Mining & Smelting Co. of Canada and the Le Roi No. 2 Mining Co., which own most of the important mines in the Rossland district, have spent years of research and a large sum of money in an endeavor to separate the gold and chalcopyrite from the pyrrhotite by wet concentration, but the two minerals have so nearly the same density that all efforts at separation by gravity failed.

Within the last few years great strides have been made in the perfecting of a combination gravity and differential flotation process and it now is possible to separate most of the gold and chalcopyrite from the great bulk of the pyrrhotite and earthy gangue. It also has been found possible to first remove the gangue by gravity concentration and then remove the pyrrhotite from the chalcopyrite by wet magnetic concentration but, to make this process effective, it is necessary first to subject the ore to a heat treatment to improve the magnetic properties of the pyrrhotite.

Either of these processes, it would seem, might be applied effectively to the Sudbury ores. It is likely, too, that the precious metals would follow the chalcopyrite, as they do at Rossland, and in this way a marked saving would be made, for, otherwise, in the manufacture of steel directly from the Sudbury ores, as is the case in the manufacture of monel metal, the precious metals would go into the pig. Exactly what would happen to the pentlandite nothing but experiment can tell, but the physical properties of the mineral are so closely allied to pyrrhotite that there is reason to expect the two minerals would stay together.

Should either of these processes of concentration prove adaptable to the Sudbury ores, it would be possible to get a concentrate containing between 50 and 55 per cent of iron, 35 and 40 per cent of sulphur, and 4 to 6 per cent of nickel. The resulting pig from such a concentrate would contain too much nickel for the manufacture of structural steel, but it easily could be diluted with scrap iron or non-nickeliferous pig to the desired proportion before it was converted into steel.

Nickel Steel from Cuban Ores

In the meantime, nickel steel is being produced directly from a nickeliferous iron ore that is found in Cuba. The ore is a bog ore, and appears to have been obtained from the basic rocks on which it now rests. The deposit covers a large area at Mayari, at the eastern end of the island and, so far as exploration has gone, has a thickness of 15 to 20 ft. The deposit has three distinct layers, readily distinguished by their respective colors. The bottom layer is a light yellow-brown, the middle layer a darker yellow-brown, and the top layer a crimson-brown.

Besides oxide of iron and a high proportion of water, characteristic of all bog ores, the deposit contains a considerable proportion of alumina and small quantities of oxides of nickel and chromium. These oxides are not evenly distributed throughout the mass but are fairly evenly distributed in the respective layers. According to J. F. Kemp, the bottom layer contains 1.49 per cent of NiO and 3.66 per cent of Cr_2O_3, while the top layer contains 0.77 per cent of NiO and 1.89 per cent of Cr_2O_3. The center layer averages about a mean of the layers between which it rests. Professor Kemp has estimated that the field contains 605,000,000 tons of ore, while a similar deposit nearby, at Moa, is estimated to contain 702,000,000 tons.

The Mayari deposit is owned and is being exploited by the Steelton plant of the Bethlehem Steel Corporation. By selecting ores from the different layers it is possible to produce steel with a nickel content ranging from 1 to 1.5 per cent, and by a slight modification of the open-hearth process the chromium content can be controlled within the desired limits. The ore, which besides containing a high percentage of combined water contains a large percentage of moisture, is nodulized in a rotary kiln at the mine. This deprives it of moisture and combined water and agglomerates it into a convenient form for shipping and one that is able to withstand the necessary burden in the furnace.

The nodulized ore, which averages 57 per cent iron, is reduced to pig iron in a blast furnace and the product is treated in a special form of open-hearth furnace. The product is a natural nickel-chromium steel, the only addition it receives being ferromanganese, to regulate the carbon and manganese contents. The finished product varies according to the purpose for which it is to be used, and ranges from 1 to 1.5 per cent of nickel, 0.20 to 0.75 per cent of chromium, 0.03 to 1.5 per cent of carbon, less than 0.04 per cent sulphur and 0.03 per cent of phosphorus, and manganese to meet any desired specification. Mayari steel, as the product is called, is in considerable demand for bridges and fabricating purposes, the bridge over the Mississippi at Memphis being constructed of this material.

A similar deposit of nickeliferous iron ore occurs at San Filipo, in Cuba, and a deposit containing less nickel but some cobalt occurs on the island of Seboekoe, Borneo. Chrome-nickel iron ores are found also in the States of Lokris and Boitis, in Greece, and in some of the islands of the Grecian Archipelago. These ores, however, differ from those found in Cuba and Borneo in that they occur as brown hematite in fissures and replacement veins. The nickel content is lower and the chromium content higher than the Cuban ores. The ore has been shipped to European iron-making centers but, so far as is known, has been used only in the manufacture of high-grade foundry pig, not in the manufacture of nickel steel.

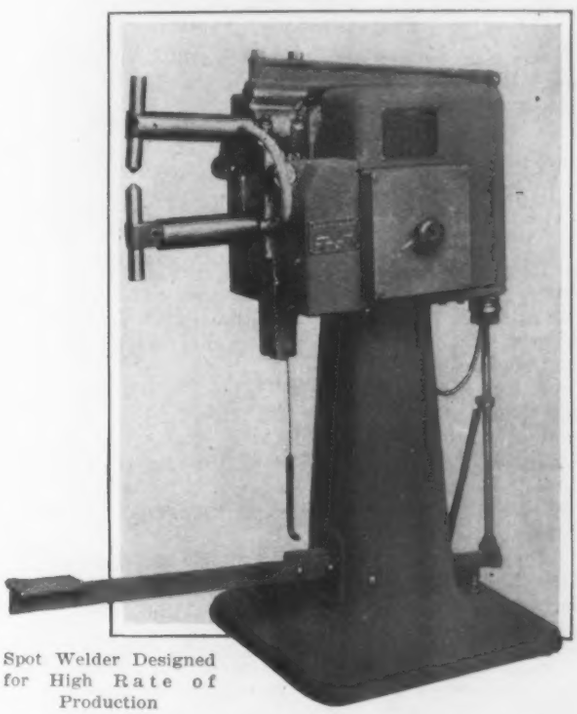
The Jones & Laughlin Steel Corporation, Pittsburgh, has been looking over sites at Memphis, Tenn., with an idea of establishing there unloading and storage facilities in connection with its river transportation service. No definte plans have been worked out, nor has the company made any land purchases. An investigation trip to Memphis recently by officials of the company was primarily for the purpose of finding out whether the company could handle its shipments at a privately owned wharf as against the municipally-owned terminal at Memphis, and to look into the possibilities of the storage of steel at Memphis for rail shipment into the interior. During at least half of the year river shipments are rendered impossible by low water and the company is figuring on getting enough steel shipped during the period of easy navigation to be able to distribute steel from Memphis the year round.

Figures compiled by *Automotive Industries* covering the relation between Ford cars and all others show a steady gain for the Ford in proportion to the total. In 1914 there were 405,000 Fords registered, this being 29.4 per cent of the total of 1,376,000 cars. Successive years since then have shown the Ford proportion steadily increasing until the 1922 figures give 5,156,000 Fords out of 10,913,000 total, or 47.2 per cent Fords. It may be noted that the other cars taken as a group exceeded the Fords in 1922 by a total of 601,000, compared with an excess of 852,000 in 1921. Thus the Ford gain over the others, in one year, was 251,000 cars. Ford registration in 1922 was 1173 per cent higher than in 1914; "all other" was 493 per cent higher.

New Spot Welder

With a range of welding capacity up to 20 kw., a machine has been placed on the market by the Thomson Spot Welder Co., Lynn, Mass. The machine, which is ruggedly built, may be equipped either with water-cooled dies and solid copper die points or with water-cooled horns and die shanks, with solid copper die inserts.

Among the improved features are listed a new design of fireproof primary coil arranged for very slow temperature rise; a new type of split transformer core, permitting quick disassembling for changing primary



Spot Welder Designed for High Rate of Production

coils; an improved secondary lead connection which has been found under long test to give high conductivity at the joint, thus eliminating heating at this point; an improved design of pressure spring with adjusting features to give longer life; an adjustable foot treadle of machinery steel in place of the previous cast steel.

Normal operation may be considerably exceeded for short periods, as the machine will stand overload and make welds quickly under these conditions. The maximum welding capacity is given as two pieces of steel or iron each 5/32 in. thick or two pieces of brass or aluminum each 1/16 in. thick.

Based on current at 1c. per kwhr., the cost of 1000 welds between two sheets of steel each ⅛ in. thick is given as 8.3c. and the time for each weld is stated to be 1½ sec. With greater thickness of steel, both time and cost increase, and vice versa. Thus, for sheets 0.03 in. thick, the time is given as ⅛ sec. and the cost per 1000 welds as ½c.

With a height of 50 in., the machine takes a floor space 20 x 48 in. Its net weight is 1000 lb.; crated weight, 1175 lb.; boxed for export, 1400 lb.

The members of the Electric Hoist Manufacturers' Association report a decrease of 22.32 per cent in the number of hoists ordered during August as compared with the previous month and a decrease of 15.12 per cent in the value of orders received. Shipments of hoists increased 23.823 per cent as compared with shipments during July.

The plant of the Magna Metal Corporation, Doremus Avenue, Newark, N. J., which was organized several years ago to manufacture magnesium metal and alloys, will be sold at public auction by the receivers, B. E. F. Rhodin and Arthur T. Vanderbilt, Oct. 5.

Progress in Making Repairs to Rolling Stock

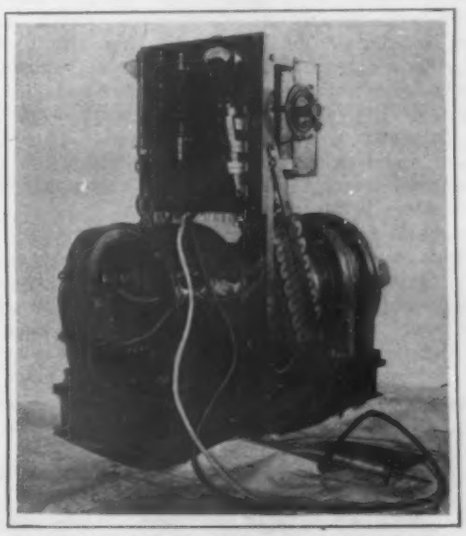
WASHINGTON, Sept. 17.—Fewer freight cars were in need of repair on Sept. 1 this year than on any date since November, 1920, according to the Car Service Division, American Railway Association. The total on Sept. 1 was 175,327 or 7.7 per cent of the number on line. This was a decrease of 13,308 freight cars since Aug. 15, at which time there were 188,635 or 8.2 per cent. Of the total number on Sept. 1, 137,229, or 6 per cent, were in need of heavy repair, a decrease of 7546 since Aug. 15, while 38,098 or 1.7 per cent, were in need of light repair, a decrease of 5762 during the same period.

The number of locomotives in need of heavy repair on Sept. 1 totaled 9392 or 14.7 per cent. This is the smallest number in need of heavy repair since Aug. 1, 1920, when the Car Service Division began compiling these reports.

A new high record was also established from Aug. 15 to Sept. 1, in the number of locomotives repaired and turned out of the shops, the number for that period being 23,056. This was an increase of 856 locomotives over the best previous record which was made during the last half of July, and was also an increase of 2976 locomotives over the number repaired and turned out of the shops from Aug. 1 to Aug. 15, this year. The railroads on Sept. 1 had 53,438 serviceable locomotives, an increase of 1100 over the number on Aug. 15, while they also had 2714 locomotives in good repair but stored for future use, which was an increase of 47 since the middle of August.

New Wilson Plastic-Arc Welder

The Wilson Welder & Metals Co., Inc., New York, has developed a new type of electric arc welding machine, one-arc capacity and rated at 200 amperes



Plastic-Arc Welder Designed for Close Control of Current

continuous welding. The principal feature of this unit is what is known as the type J control panel to secure close control of the welding current at the arc. Its chief function is to provide constant temperature in the weld and the entire unit is small, compact and ready for immediate operation.

The Drop Forge Association, 300 Chestnut Street, Philadelphia, H. N. Taylor, president, has issued an invitation to all members of the drop forging trade, visiting the Steel Treaters' Convention in Pittsburgh next month to attend a dinner to be held on Wednesday, Oct. 10 at 6.30 p. m. at the William Penn Hotel. At that time, plans will be considered for a similar joint meeting of drop forgers and supply men in 1924. All companies engaged in the manufacture of drop forgings are cordially invited to send representatives to this meeting.

ELECTRICITY IN METALLURGY

Electric Blast Furnaces—Properties, Composition and Uses of French Electrolytic Iron

The French Society of Civil Engineers devoted three sessions last April and May to the use of electricity in metallurgy. These sessions were addressed by specialists in the various branches of the subject and there was a final discussion. A long review of the important points brought out is given in the *Revue de Metallurgie* for July.

Electric Blast Furnaces

First comes an interesting section on progress in the making of steel in the electric furnace, but with nothing particularly new to the workers in this art in the United States. It is followed by one on the making of pig iron in the electric furnace. There are now 30 electric blast furnaces in the world, distributed as follows: 18 in Sweden, 1 in Japan, 3 in Norway, 6 in Italy and 2 in Brazil. With the exception of those in Japan and Italy they all use charcoal as the reducing agent. In addition a number of open top furnaces with hanging electrodes have been used intermittently for making pig iron in France, Sweden and Italy.

In these furnaces charcoal is to be preferred as a reducing agent for small units, a mixture of charcoal and coke in average size furnaces, and coke in the large units. For short runs these furnaces are worthy of consideration; they can use spare or peak load current, also a change to the making of various ferro-alloys can be quickly carried out, and ore or scrap can be used as raw material.

Electric vs. Open-Hearth in France

Next comes an interesting discussion on electric furnace practice by M. Suhr. He finds that the slow growth of electric steel making in France is because of the excellent open-hearth steel made, which he says cannot be exceeded in quality by any steel. He believes the electric furnace should be reserved exclusively for refining and for operations under reducing conditions. By carrying out preliminary work in the basic Bessemer or open-hearth the oxide slags can be excluded, and deoxidation and desulphurization are rapid and simple if carried out with a short arc, that is, with a low voltage between 35 and 40 volts.

To obtain satisfactory costs he suggests for French conditions a combination of the basic Bessemer and electric furnaces of 30 to 35 tons capacity. The power required would be 2500 to 3000 kwhr. with a practically stable power factor between 85 and 90 per cent. For these furnaces he believes the Soederberg electrodes would be necessary, and also believes the power consumption per ton of finished steel would be between 150 and 200 kwhr. The total cost should not be more than that of ordinary open-hearth steel.

A brief reference to direct steel is made by M. Chaplet, who mentions some experimental work carried out at Giffre, where 0.20 per cent carbon steel was made direct from ore in a 150-kwhr. furnace. This steel made out of contact with air had remarkable properties. It was as soft and malleable as an ordinary steel with 0.08 per cent carbon. Also a direct steel was made with 2 per cent carbon that could be forged cold, notwithstanding its hardness. These properties are attributed to the fact that the material was at no time in contact with oxygen or nitrogen.

Next come interesting sections on aluminum and magnesium and ultra-light alloys, followed by one on electrolytic iron by M. A. Bouchayer.

Electrolytic Iron

This section deals with the "Bévé" electrolytic iron made by Bouchayer and Viallet at Grenoble, and its applications. Reference may be made to an article on this same subject in THE IRON AGE, March 11, 1920, page 732. Since the beginning of 1922 this plant has been functioning normally and can turn out 2 tons per day. The metal is obtained in cylindrical tubes, length 4 meters (13 ft. 1½ in.), diameter 80 to 200 mm. (3 5/32 in. to 7⅞ in.), thickness 1/10 mm. to 7 mm. (0.04 in. to 9/32 in.). The regularity of thickness is perfect and the properties of the metal are very uniform.

When first produced it contains about 5½ times its volume of various gases, chiefly hydrogen, but with nitrogen, carbon-monoxide and carbonic acid gas. It is silver white, satiny and iridescent, the iridescence diminishing with perfection of deposit. The surface is smooth, regular and soft to the touch. The structure is exceedingly fine and close. Annealing eliminates the occluded gases, the maximum temperature being 950 deg. C., although annealing in a vacuum or even melting is necessary for theoretical complete removal of the gases. As is well known, this is accompanied by considerable softening of the metal.

Properties and Analysis

Some properties of the annealed iron are given below. Chemical analysis compared to that of Swedish iron is as follows:

	Electrolytic Iron, Per Cent	Swedish Iron, Per Cent
Carbon	0.029	0.160
Manganese	0.00	0.013
Phosphorus	0.0037	0.034
Sulphur	0.0048	0.0069
Silicon	0.004	0.05

In addition the special iron contains a little lead and copper coming from the anodes. The lead is generally from 0.02 to 0.2 per cent, and the copper from 0.02 to 0.1 per cent. A characteristic is the complete absence of manganese.

A test carried out at the Usines d'Allevard in melting electrolytic iron scrap for making bars and wire gave an ingot with the following composition: Carbon 0.09, man. 0.072, phos. 0.07, sul. 0.01 and sil. 0.089 per cent. [The phosphorus is so given in the article.] The fracture of the annealed iron is analagous to that of Swedish iron.

The physical properties of the iron as deposited are: Elas. limit 108,090 lb. per sq. in., ult. stress 113,780 lb. per sq. in., and elongation in 3.94 in. 3 per cent. After annealing the results are:

	Longitudinal	Transverse
Elas. limit, lb. per sq. in.	25,170	26,740
Ult. stress, lb. per sq. in.	42,380	42,100
Elon. in 3.94", per cent	42.7	37.3

Experiments regarding porosity show that it is not permeable to dissolved acetylene at 60 atmospheres pressure, nor acetone, the internal pressure after two months not having diminished. A diagram is given from some of Yensen's work in this country showing the very low hysteresis of this material.

Some of the Uses

The uses of the iron are very interesting. It is used for melting as a source of pure iron. The methods of production allow tubes to be made of the exact thickness required to meet various pressures and conditions. An unexpected use is for radiators for heating rooms and houses. The heat efficiency is 10 to 15 per cent better than that of the usual cast iron. In the previous article reference is made to its use for the oil cooling system of transformers. For stamped ornamental work it is easily applied because of its great ductility. It is of use for tanks for compressed gases, and all the welding at the Bouchayer and Viallet plant is done with this metal.

The main article then takes up the use of electricity in the electrolysis of metals, electric furnaces for brasses and other alloys where American furnaces are prominently mentioned, and electric heat treatment furnaces. There is a very good and complete final section on the making of electrodes, both of amorphous carbon and of graphite.

G. B. W.

The New England Foundrymen's Association held its first fall meeting Wednesday, Sept. 12, at the Exchange Club, Boston, some 80 attending. George A. Ray, Hartford, Conn., president, presided. No business was transacted. George A. Richardson, Bethlehem Steel Co., Bethlehem, was the guest of the evening. He gave an illustrated talk on Mayari pig iron, a product of the Bethlehem Steel Co. Robert MacDonald, also of the Bethlehem Steel Co., led the discussion which followed Mr. Richardson's talk.

J. LEONARD REPLOGLE

What Industrial America Wrought in the World War

Grosvenor B. Clarkson, Formerly Director of the United States Council of National Defense, Tells the Story of the Great Service Rendered by Steel Manufacturers and Other Business Men in Bringing Victory to the Allies

"HERE is a good and useful book," says Clemenceau in his introduction to "Industrial America in the World War—The Strategy Behind the Line, 1917-1918,"* by Grosvenor B. Clarkson, formerly director of the United States Council of National Defense.

The book is all that Clemenceau says, and more, for it is a wonderful story of what industry did to win the war. After having heard so much criticism, just and unjust, of public officials and business men during and since the great conflict, it is highly satisfactory to read Mr. Clarkson's well written account of what was done. He does not, of course, claim that the carrying on of the war was free from errors, nor does he conceal the fact that some men were unpatriotic, or at least not so patriotic as others, but emphasis is placed on achievement rather than on carping criticism, and the story as a whole is one which will stir the pride of every American.

"Mr. Clarkson is right": says Clemenceau, "the men who won the war behind the lines—on which victory at the front depended—are entitled to the gratitude of the nations, and the nations do not even know their names. It is time that justice should be done these men, and this book hastens that day. We Frenchmen, who are eternally thankful, despite the troublous times through which we have lately passed, to our good comrades in arms from beyond the seas, remember with gratitude the organizers of the industrial victory, who made military victory possible. They have modestly gone back to their offices and factories, with the sole reward of duty well done. Let them receive our cordial thanks; they have deserved well of the Allied and Associated Nations."

Early in the book, the author, who happens to be a Republican, makes a positive statement with regard to Secretary of War Baker and his five Democratic Cabinet associates forming the Council of National Defense. Mr. Clarkson says that, looking back on the three years during which he served the council, he is unable to recall a single instance in which Mr. Baker or the council requested him to make an appointment or take an administrative action on a partisan or political basis. He says that to Secretary of War Baker should undoubtedly go the credit for making possible the nonpartisan state of affairs which did honor to the Government and the country alike. This attitude, he adds, reflected the policy of the President with respect to enlisting the best industrial and scientific brains of the country, regardless of party affiliations.

In his chapter entitled "The War Industries Board Emerges," Mr. Clarkson says that "so quiet and unobtrusive were the extensions and projections of this central control that to this day there is little general understanding that through the War Industries Board the United States had in the end a system of concentration of commerce, industry and all the powers of Government that was without compare among all the other nations, friend or enemy, involved in the World War." Mr. Clarkson adds—"Never before was there such a focusing of knowledge of the vast field of American industry, commerce and transportation. Never was there such an approach to omiscience in the business affairs of a continent."

One of the most intensely interesting chapters of the entire book is the one entitled "The Personal Element." A striking picture of Bernard Baruch is painted. "All who came in contact with Baruch when he was chairman of the War Industries Board," says Mr. Clarkson, "were impressed by his simplicity of motive. Inspired by patriotism of the highest and intensest order, he had one single objective—the winning of the war. His mind had no room for intrigue and the advancement of personal ambitions, large or small."

Mr. Clarkson refers to Frank A. Scott, first chair-

*"Industrial America in the War," by Grosvenor B. Clarkson; 576 pp., 6 x 9; price $6. Houghton Mifflin Co.

GROSVENOR B. CLARKSON, when appointed secretary of the United States Council of National Defense and Advisory Commission in March, 1917, had been well prepared for the position by a varied background of experience. He had been a reporter, director of the criminal investigation work of the Department of the Interior in southern New Mexico, advertising man, and assistant chairman of the committee on industrial preparedness, United States Naval Consulting Board. In the last named office, he directed the first organized educational campaign in this country for industrial preparedness.

Mr. Clarkson became acting director of the council in July, 1918, and, becoming director in December of the same year, held the office until March, 1920. Besides directing personally the council's field division, he initiated and directed the council's post-bellum reconstruction work. In this connection, he started the movement to make permanent the community councils throughout the country. He initiated the work of the interdepartmental defense board under the council, to study and classify in peace-time America's economic resources for defense.

G. B. CLARKSON

man of the War Industries Board, and one of the pioneers in building the American war machine, as "one of the sacrifices to its grinding labors." Mr. Clarkson tells how Mr. Scott, a student of military affairs from boyhood, became deeply interested in the industrial implications of war. On three different trips to Europe before 1914, he carefully studied the production of military *materiel* in England, Russia, Germany, France, and in a minor way, in Italy. As early as 1909 he came to the conclusion that Germany was preparing for a war of conquest "and that she would so overtop her immediate enemies, owing to her industrial preparedness, that the United States would be forced to join the league against her in order to prevent Germany from becoming the world's dictator.

"The extraordinary development of by-product coke ovens in Germany, and even in England by German capital, indicated that Germany was planning far ahead for a great supply of the ingredients of high explosives. Scott found like signs in the development of the dye industry and the building of plants for the fixation of nitrate. The discovery in the winter of 1914 that Germany had placed orders for a certain type of turret lathe, used in the production of fuses, on such a scale that it would have absorbed the entire annual capacity of the United States, absolutely confirmed in his mind the opinion arrived at in 1913 that the war would begin in 1914—an opinion that was even then so near a judgment that Mr. Scott caused his own company's turret lathe plant to be made ready for the orders that he was sure would soon be coming from Germany's enemies."

Mr. Replogle's Characteristics

Of J. Leonard Replogle, director of steel supply, Mr. Clarkson speaks in words of well deserved praise, saying in part:

"J. Leonard Replogle had a hard place to fill. A young man of high renown in the world of iron and steel, he was called upon to take a position that necessarily brought him into opposition with the chief men and interests of his calling. In serving the Government he stood to block his own career. In such a position a man might err on either side: he might drive too hard bargains for the Government or he might be too considerate of the industry. From beginning to end, Replogle made the public interest first, but he was fair to business. When he entered the Government he had only one minor interest that could be directly affected by his position as director of steel; that interest lost money throughout the war. As the conserver as well as the producer of steel, Replogle gave a rare exhibition of courage when he resolutely directed the whole steel output of the country to direct or indirect war purposes. Often he had to defend his policy against the great steel corporations as well as against the great users of steel. His complete knowledge of every angle of the business qualified him for this important position. Specious arguments and manipulated cost-sheets meant nothing to him. His position duly taken and fortified with the facts, he stood like a rock against both assaults and importunities. He forced down prices and increased production; things that the steel men had said could not go together."

Referring to the correspondence between the "industrial dictator" and President Wilson, Mr. Clarkson says: "There is revealed an unfailing promptness on the part of the President to concur in every undertaking of the former and an unexpected closeness of the President to all the supply problems." Mr. Clarkson adds:

"In passing, the writer is prompted to say that, in the course of the preparation of this book, he has interviewed some two-score of the executives of the War Industries Board and the Council of National Defense, and all of them, regardless of party affiliation, who had any personal contact with President Wilson, united in expressing appreciation of his quick grasp of the fundamentals of the most abstruse and technical problems that were laid before him. It is possibly true that the President did too long defer a determination of the problem of industrial centralization for war purposes; but on the other hand, once he had decided his course and mapped it in the lucid and comprehensive letter of authority to Mr. Baruch, the supporting decisions thereafter were always prompt and clear-cut."

Showing how great was the response to the demands of the Allies, Mr. Clarkson recalls that when Marshal Joffre came to the United States in June, 1917, he talked about one division of troops at once as a convincing symbol of alliance, and perhaps 400,000 or 500,000 soldiers in France at the most. "One year later," says Mr. Clarkson, "the most unmilitary of the great nations had 2,000,000 soldiers in France and more than 3,600,000 under arms; was preparing to put and maintain 5,000,000 men in France and conduct the war single-handed against Germany, 3600 miles distant, if both France and England should be prostrated."

Priority Policy

Considerable space is devoted to the priority policy of the Government. "Priority," says Mr. Clarkson—"with experience and study, became the most efficacious implement of Government ordinance of industry. It was the sturdy shovel with which the War Industries Board cleared up the blockade and kept the tracks open. It was nothing less than a great system of industrial and transport precedence, automatic in the main, manipulated in the exception, whereby production was ordered, restrained, or stimulated to meet current and projected war demands and prevent the civil population from suffering destitution in the midst of prosperity. In effecting these immediate ends, it automatically checked profiteering and repressed prices."

Mr. Clarkson says that the wisdom of Solomon could not have infallibly decided all the questions that were presented in the administration of priority regulations. For example, such questions as these were constantly presented:

"Should steel go to destroyers whose mission was to sink submarines or to the merchant ships the submarines had thinned to the point of breaking down the food supplies of the Allies? Should brass go to binoculars without which cargo ships could not leave port or to shells without which they need not go at all? Should nitrate go to munitions without which guns were useless or should they go to fertilizers without which the artillerymen would be foodless? Should acetone, indispensable for British explosives, go to the powder mills or to airplanes which needed it for their wings? Should chrome steel go to indispensable army trucks or indispensable army munitions? Should women be condemned to steelless corsets or tinless preserved vegetables? Should cranes go to American wharves for loading ships for France or to French wharves for unloading the same ships? Should ships from Brazil bring coffee to bolster civilian morale or manganese for fighting steel?"

Probably few men in the steel industry except those who were receiving confidential orders from the Government knew how closely the making of steel was connected with the efforts of the soldiers in the field. Showing the prompt response of the steel manufacturers, Mr. Clarkson cites this example:

Prompt Response of Steel Works

"In August, 1918, the French reported that the draft of the combined French and American armies on French 75 mm. shells was unexpectedly greater than production and that the reserves were being perilously depleted. They had fallen from 30,000,000 to 13,000,000. The Germans were on the run and then was the time to hammer them without stint. No shells were coming from America, and yet the French munitions plants were working only half-time for lack of steel. Within five days of the time that the French reported the situation to the Foreign Mission of the War Industries Board, the mission had satisfied itself of the correctness of the French representation and cabled the board for immediate assistance. On the sixth day, by direction of the War Industries Board, the Lackawanna Steel Co. and the Carnegie Steel Co. were diverted to the production of 75 mm. steel and the first shipments arrived in France within three weeks. The steel was actually arriving in France before the French Ministry of Munitions had formally placed orders for it. It came rolling into the French shell plants in such unfailing quantities that, with the 10,000 guns of the

American and French batteries blazing away as never before, the French reserves went up to 19,000,000 shells. That is priority in action."

"The Control of Prices" forms an important chapter of the book, telling the story of how some manufacturers came slowly and others rather quicker to a realization of the fact that prices must be reasonable and the same for all the enemies of Germany. When the President laid down the rule that prices must be the same as for the public, he declared: "Prices mean the same everywhere now; they mean the efficiency of the nation, whether it is the Government that pays them or not; they mean victory or defeat." Price-fixing by the War Industries Board was not, however, an arbitrarily proclaimed or abruptly determined process. It always took the form of negotiation, and the results were, strictly speaking, agreed rather than decreed prices. Mr. Clarkson recalls this interesting incident:

An Historic Occasion

"On the historic occasion when the 65 delegates of the steel industry met the board in full session to determine steel prices, Judge Elbert H. Gary, speaking for his associates, solemnly inquired of Judge Lovett, of the board, as a lawyer:

"'May I ask by what authority the War Industries Board has undertaken to fix these prices?'

"'A gentleman of your eminent qualifications in law,' was Judge Lovett's answer, after a moment of profound silence, 'requires no information from me on that point.'

"And with a grim smile all around, the board and the delegation proceeded to fight it out. It was no parlor debate, either. The board was armed with facts and figures about steel and iron production and costs, not only from the exhaustive investigations of the Federal Trade Commission, but from the inside information of Replogle and other steel men who were playing the Government's game."

In direct opposition to the contention of many during the war that the neglect of Allied industrial integration was a profound error, Mr. Clarkson remarks that "there was always a menacing possibility that France might have been inundated by the Germans, and her industrial potency annihilated, leaving America, had Allied economic unity been effected, without facilities at home or abroad with which to continue the contest."

The chapters headed "The Control of Labor," "In the Seat of Power," "The Backbone of the Board," "The Commodity Sections," abound in interesting discussion and important historical facts. Then comes the chapter "Steel: An Epic of the World War," a chapter whose reading will make every man connected with the steel business feel proud that he has such a connection. Only a mere outline can be given here.

"The World War was moved and fought on steel," says Mr. Clarkson. "In its last days it was as much a Vulcanic struggle between the Mesabi and Lorraine, between the Ruhr and Pittsburgh, as it was a final grapple of men in Flanders, Champagne and the Argonne."

Mr. Clarkson says that at first Judge Gary advocated excessive prices in the face of refuting figures by his own accountants, but the steel men soon adapted themselves to the view that the national need was above the question of profits. Price McKinney was among the first to take a conspicuously patriotic stand, as is shown by this story related by Mr. Clarkson:

Price McKinney's Patriotic Position

"Even at the height of this saturnalia of high prices, J. Leonard Replogle, who had been called to Washington by Mr. Baruch to advise the War Industries Board as to steel, expressed the confidence that when the situation clarified, just prices could be obtained from the steel industry without resort to compulsion. In fact, on the very day he voiced this opinion, he was able to put it to the test. The Italian Government was in the market for 40,000 tons of steel billets, which were then bringing around $140 a ton in the open market. Price McKinney, of the McKinney Steel Co., of Cleveland, happened to be in Mr. Replogle's office. They discussed the general steel situation and the Italian requirement. Mr. Replogle said it was obvious that steel could not bring such prices much longer, and asked Mr. McKinney to determine a fair price for the Italian order.

"Write the ticket yourself, Replogle," was Mr. McKinney's answer. "Any price you name, profit or no profit, will be satisfactory to me."

Replogle figured and said he guessed $45 a ton would be about right. That was $3,000,000 swept away, but McKinney stood pat.

On another occasion, Mr. McKinney said: "We are making more money out of this war than the average human being ought to," and once when Judge Gary was informing the board that the steel interests would not ask for an increase of prices at the expiration of the ninety-day period for which prices were established, he dwelt on the fact that the level price plan accrued greatly to the profit of the Steel Corporation, "but," he added, "the tax collector comes along and takes about 50 per cent of it—and I wish it was more."

Only One Purpose—Winning the War

Later Judge Gary declared that the steel industry under Government control had become such a unit that no member of it had any right to conduct his business with a view to individual profit when it was simply an integration that must be treated as having only the one purpose of winning the war.

On one occasion Mr. Baruch casually remarked to Judge Gary that the country was deficient in forging plants and orders were issued the next morning for an eight million dollar extension of the Steel Corporation's forging capacity.

Mr. Clarkson speaks at some length of the attitude of automobile manufacturers in opposing regulatory measures of the Government. He says that the early and unwise designation of the automobile industry as a non-essential was undoubtedly the chief cause of the stubborn resistance it offered to curtailment and conversion. In spite of this attitude, the industry rendered great service. In concluding this chapter, Mr. Clarkson says:

"The relation of the Government to the steel industry, when fully realized, was perhaps the best example the war afforded of the masterly conception of industrial mobilization and functioning by the simple process of establishing effectual contact between a pooled and compactly united industry manned by its own captains and a governmental organism, expert, initiative, resourceful and energetic. It was a model of that highest and best form of efficiency which President Wilson declared to be 'the spontaneous cooperation of a free people.'"

Mr. Clarkson next takes up other industries, such as copper, platinum, ferroalloys, nitrates, lumber, leather, textiles, showing how each did its part.

In the concluding chapter Mr. Clarkson says that "we are still too near the close of the war to appreciate what has been done by supremely able men who came to great tasks. When the war was over, they did not march up Fifth Avenue to the cheers of their admiring countrymen. They modestly went back to their desks, and sometimes they were followed by investigators, who sought to advertise themselves rather than serve any patriotic purpose."

"The men of the War Industries Board," says Mr. Clarkson, "and those who preceded them in too loosely joined committees and boards, deserved well of their country, and, though their deserts are not symbolized in triumph, they will eventually come into them."

While there is ground for some difference of opinion in regard to both men and methods, the reader of Mr. Clarkson's book is impressed by the thoroughness of his work, and his amazing ability in collecting facts and in presenting them in an attractive manner. He has made a highly important contribution to the history of the World War, a book which should be widely read, especially by business men. G. S.

FOR GRAY IRON CASTINGS

Tentative Specifications Adopted by the Test Bar Committee of British Foundrymen

Publication has just been made in Great Britain of the tentative specifications for gray iron castings prepared by the Test Bar Committee of the Institute of British Foundrymen and submitted for the consideration of the British Engineering Standards Association.

The chemical composition to which castings should conform has not been included in the tentative specifications, the committee explains, because of the absence of reliable data as to the cumulative effect of the constituent elements on cast iron. The committee states that it was practically unanimous in deciding to recommend three sizes of bars, each of which would be related in thickness and therefore in structure to the castings it represented. On this point, the British Cast Iron Research Association, acting independently, reached a similar conclusion.

The tensile loads proposed in the specifications are all in present use and are embodied in various British Engineering Standards Association specifications, excepting in the case of the largest bar. The committee comments on the fact that its bar M, having a diameter of 1.2 in., is the size of bar suggested by the Cast Iron Committee of the American Society for Testing Materials for use as the international arbitration bar. The proposed specifications are as follows:

Process of Manufacture

1. Gray iron for castings may be made from metal melted in any metallurgical plant except an iron ore smelting furnace, in which case permission in writing must be received from the engineer or purchaser.

Molding

2. The castings shall be accurately molded in accordance with the pattern or working drawing supplied by the engineer or purchaser with the addition of such lettering as may be presented.

Classification

3. Iron castings shall be one of two grades in accordance with the purpose for which they are to be used, as specified by the purchaser and as approved by the inspecting body. The grades of casting, whether grade A or grade B as given below, shall be specified on the drawing, inquiry or tender from and all other documents having reference to contract or order by the purchaser.

Designation of Classes

4. Grade A is to include important castings.

Grade B is to include all other castings which require to conform to mechanical standards.

Mechanical Tests and Selection of Test Pieces

5. Gray cast iron castings must comply with the following mechanical tests, if such are required. All test pieces shall be selected by the inspector and tested in his presence and he shall satisfy himself that the conditions herein prescribed are fulfilled.

Dimensions of Test Bars

6. The average sectional thicknesses of any casting shall determine the size of the test bar to be utilized. Thus (a) for all castings where no main cross section of the metal exceeds ¾ in. in thickness, a bar of 0.875 in. diameter cast 15 in. long, and hereinafter referred to as bar S, shall be used; (b) for all castings where no main cross section of the metal exceeds 2 in. in thickness or is less than ¾ in. in thickness, a bar of 1.2 in. diameter, cast 21 in. long, hereinafter referred to as bar M, shall be used; and (c) for all castings, where no main cross section of metal is less than 2 in. in thickness, a bar 2.2 in. diameter, cast 21 in. long, hereinafter known as bar L, shall be used.

Method of Preparing Test Pieces

7. The test-pieces for grade A shall be cast on wherever possible; that is to say, the mould for the casting and the mold for the test piece shall be joined together in such a manner that the liquid metal fills both simultaneously. When practical conditions do not permit of this, or when the consent of the purchaser or engineer is obtained, the procedure outlined for grade B shall be followed. Test pieces for grade B may be cast separately at the option of the supplier, and shall preferably be cast in duplicate sets of two bars, each of the dimensions specified in clause 6.

Two test pieces shall be cast in a molding box, and the mold shall consist of dry sand, green sand or loam, depending on whether the casting to which it refers is molded in dry sand, green sand or loam. The test pieces shall be cast from the same ladle as the casting or castings they represent, and as nearly as possible at the same pouring temperature. The test pieces shall possess the same thermal history as the casting or castings they represent, and shall be left in the mold until nearly cold. The test pieces may be tested transversely as cast or skin-machined at the option of the purchaser or engineer.

Transverse Tests

8. The transverse test pieces, specified in clause 5, shall be tested in the manner shown in Appendix I and shall conform to the following minimum requirements:—

Grade	Bar		
A	S	1,185 lb. associated with in. deflection.	0.12
	M	1,950 lb.	0.15
	L	10,000 lb.	0.12
B	S	1,050 lb.	0.10
	M	1,715 lb.	0.12
	L	9,000 lb.	0.10

Tests Required from Modified Dimensions

9. If the diameter of a transverse test bar be found to be 0.125 in. greater than standard it shall be turned down to the dimensions specified in clause 6. If, however, the diameter of a transverse test bar, as cast, is not greater or less than one-tenth of an inch of the standard dimensions, and the test piece is a true cylinder, then the following tests shall be met:—

Grade	Bar	Diameter in In.	Breaking Load in Lb.
A	S	0.975	1,639
		0.925	1,400
		0.825	993
		0.775	823
B	S	0.975	1,453
		0.925	1,240
		0.825	880
		0.775	729
Grade	Bar	Diameter in In.	Breaking Load in Lb.
A	M	1.30	2,479
		1.25	2,204
		1.15	1,715
		1.10	1,502
B	M	1.30	2,180
		1.25	1,938
		1.15	1,508
		1.10	1,321
A	L	2.30	11,426
		2.25	10,697
		2.15	9,330
		2.10	8,696
B	L	2.30	10,284
		2.25	9,628
		2.15	8,400
		2.10	7,828

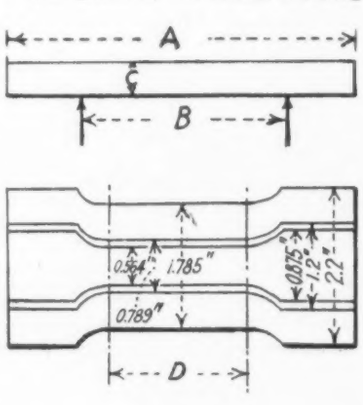
Tensile Test Pieces

10. The tensile strength shall be determined from test pieces of standard dimensions (see standard tensile test piece S, M, or L, Appendix). These standard test pieces shall be prepared from one portion of the broken transverse test piece.

Tensile Tests

11. For grade A, the tensile breaking strength of gray cast iron castings must be greater than 12 tons per sq. in. for bar S, 11 tons per sq. in. for bar M, and 10 tons per sq. in. for bar L.

For grade B, the tensile breaking strength of gray cast iron castings must be 10 tons per sq. in. for bar S and 9 tons for bars M and L.



Section of Standard Tensile Test Piece, Indicating Varying Dimensions of the Three Sizes Recommended. Details are given in the Appendix on the following page

Additional Tests before Rejection

12. Should the first test fail, the inspector shall break a second set, or if the bars represent a number of castings made from the same raw materials, then additional bars

may be taken from any selected casting at the option of the supplier. If these test pieces do not reach the minimum tests specified in clauses 8, 9, and 11, then the casting or castings shall be rejected by the engineer or purchaser.

Chemical Analysis

13. Where physical tests are specified, the percentage of any chemical element other than phosphorus shall not be specified and then only its maximum percentage.

Inspection

14. The representative of the engineer or purchaser shall have free access to the works of the supplier at all reasonable times during the course of the manufacture of the castings, he shall have power to inspect the manufacture of the castings at any stage and to reject any casting or material that is unsound or does not otherwise conform to the terms of this specification.

Testing Facilities

15. The supplier shall furnish, prepare and test all test pieces at his own cost, either in his own works or elsewhere.

Appendix

Transverse Test Pieces.—A for Bar S = 15 in.; for Bar M = 21 in.; for Bar L = 21 in.

B for Bar S = 12 in.; for Bar M = 18 in.; for Bar L = 18 in.

C for Bar S = 0.875 in.; for Bar M = 1.20 in.; for Bar L = 2.2 in.

P = the parallel length to be not less than 2 in.

Tensile Dia. in Center.—Bar S = 0.564 in.; Bar M = 0.798 in.; Bar L = 1.785 in.

Slow Delivery of Cast Iron Pipe Delays Gas Company Projects

MILWAUKEE, Sept. 17.—Inability of cast iron pipe foundries to make prompt deliveries of gas mains is holding in suspense a number of important projects of Wisconsin gas companies, according to a statement made by the Wisconsin Public Utilities Bureau, Milwaukee. The shortage of pipe, the statement says, is attributed to the unprecedented demand created by extensive building operations throughout the country, which have crowded pipe founders to the limit and make it necessary for them to take orders subject to six months' delivery. "In addition to the shortage, prices are higher than last year," the statement says. "Present quotations made on gas pipe are $69.90 per ton; the highest in 1922 was $62 per ton, and in 1921, $56 per ton." The situation of the Milwaukee Gas Light Co. is cited as an example of the acute condition. This utility has laid 67,548 ft. of gas main this year and its 1923 project includes 90,453 ft. additional, which probably will have to be deferred until 1924 because founders have notified the company that they cannot deliver pipe contracted for early in August until after Dec. 15.

Newark Wire Cloth Co.'s New Plant

The Newark Wire Cloth Co.'s new plant at Verona Avenue and North Second Street, Newark, N. J., was formally dedicated Saturday afternoon, Sept. 15. Employees, through Louis Beyer, foreman of the fine wire weaving department, presented President John C. Campbell a desk chair and framed photograph of the building. Those who had part in the building's construction presented a flag pole and large American flag which was raised by James V. Taylor, father of Congressman Herbert W. Taylor of Newark. The plans for the building were drawn by Alvin A. Campbell, son of President Campbell, and one of the officers of the company. The new buildings, 100 by 300 ft., is of reinforced concrete, truss construction having made possible the elimination of all pillars from the 31,000 sq. ft. of floor space. The Norse & Whyte Co., Boston, was taken over by the Newark Wire Cloth Co. some time ago, as was also part of the equipment of the Rogers Wire Works, Belleville, N. J. The new building represents an investment of $95,000. Newark's business and manufacturing interests had been invited by President Campbell to inspect the building, and responded in large numbers.

Western Electric Places Large Contracts

Contracts aggregating about $1,000,000 have been placed for manufacturing machinery and equipment to be used in the cable and telephone switchboard works the Western Electric Co. is erecting at Kearny, N. J., according to a statement issued by the publicity department of this company. The statement says further:

"Some of the individual orders for machinery in this group of contracts are the largest single orders of the kind ever placed. Other contracts that entail an expenditure of about $250,000 additional for machinery and equipment in the company's power house also have been placed. Besides these several contracts another involving an expenditure of approximately $180,000 for structural steel to be used in the cable plant buildings has been executed with the American Bridge Co.

"Work on the cable and telephone switchboard works is progressing rapidly. Ten pile drivers are at work on the construction of the new 1600-ft. bulkhead and the piling and foundations for the buildings are well under way.

"Grading and filling is proceeding steadily on the 60-acre tract where next fall 600 employees, the first contingent on the ultimate 30,000, will be at work in the first group of buildings in the Western Electric Kearny works which, when completed, will cost more than $20,000,000."

Inefficiency of Union Labor in Coal Mines

WASHINGTON, D. C., Sept. 18.—Figures as to comparative efficiency and earnings of bituminous coal miners in union and non-union fields have been presented to the United States Coal Commission, coupled with the charge that hampering of output by the United Mine Workers of America is a deliberate policy, despite its injury to the individual miner as well as to the operator.

In 14 mines in the Kanawha district of West Virginia, which worked first under union regulations and later as non-union mines, the increase in output per man per day in all classes of labor combined, after the exit of the union, is given as 99 per cent by Col. Henry L. Stimson and Goldthwaite H. Dorr, counsel for the Bituminous Operators' Special Committee, who filed the brief. These same mines, the brief declares, show an increase of 102 per cent in the daily earnings of the men since the union lost its hold on the operations.

In spite of the normal tendency of men to increase their efficiency from year to year, the brief says, the mines which have changed from non-union to union management have shown a let-down in individual efficiency, in marked contrast to those which, like the Kanawha group, have been freed of union domination and have rocketed to higher efficiency and greater earnings for the miners.

Record Production of Portland Cement

August showed a new record in the output of Portland cement, with 12,967,000 bbl., replacing the previous record of 12,910,000 bbl. produced in May. This makes four successive months with more than 12,300,000 bbl., the smallest of the four being larger than the figure for October, 1922, which was the highest month's output previous to this year. For the eight months of the year to date the production has been 87,907,000 bbl., compared with 70,139,000 bbl. for the corresponding eight months of last year, which in itself was a record up to that time.

Shipments in August aggregated 14,971,000 bbl., which again is a high record, displacing the figure of 14,361,000 bbl. in August, 1922. The highest previous figure in 1923 was in May, with 14,257,000 bbl. For the eight months of the year to date shipments in 1923 have aggregated 90,909,000 bbl., compared with 76,240,000 bbl. for the eight months last year, itself a record up to that time.

Manufacturers of coal-breaking machines are requested to send their catalogs and prices to Scientia, 26 rue Troyon, Sèvres, France.

Steel Buying at Youngstown—Blast Furnace at South Chicago to Be Rebuilt

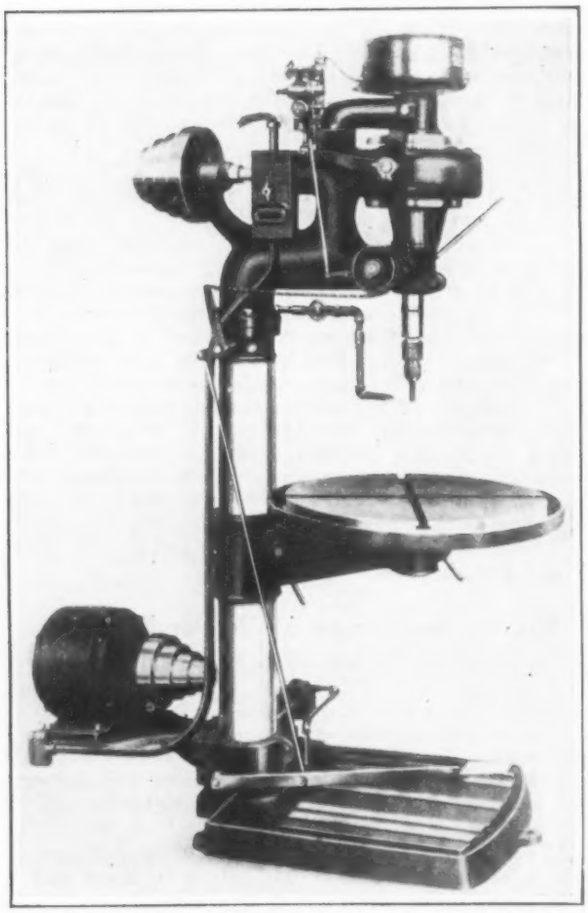
YOUNGSTOWN, OHIO, Sept. 18.—Buying of steel products is not equal to the tonnage shipped, states President James A. Campbell, referring to conditions with the Youngstown Sheet & Tube Co. Operations are being maintained at a high rate, however, by reason of the large unfilled tonnage on the company's books.

The Sheet & Tube company has awarded a contract to the William B. Pollock Co., Youngstown, for the rebuilding and enlarging of a blast furnace at the South Chicago plant of the Steel & Tube Co. of America. The stack's capacity will be increased to 500 tons.

Mr. Campbell has just returned from an inspection of the company's properties in the Chicago district. Other improvements are contemplated and an early decision is expected on them, so that construction may start before winter. At the time the Steel & Tube company properties were acquired, Mr. Campbell stated the extension program involved the addition of another blast furnace at the Indiana Harbor plant and steel making and rolling capacity.

Pneumatic Oscillating Tapping Machine

An automatic pneumatic oscillating tapping machine has been put on the market by the W. Gaterman Mfg. Co., Manitowoc, Wis. The machine is entirely automatic and does not require the attention of an operator, it is said, to prevent tap breakage. It is also stated



Oscillating Tapping Machine Run by Air and Designed to Avoid Tap Breakage and Stripping of Threads

that it prevents the stripping of threads, making it possible to cut perfect threads in the most delicate tapping jobs. In its automatic operations it imitates hand tapping, although it is said to be far more sensitive, as the working strain upon the tap is weighed to a fraction of an ounce at all times by an adjustable spring scale balance drive on the tap. No dependence is placed on slippage to prevent tap breakage. On the contrary, the machine has a positive pneumatic action which automatically oscillates the tap spindle just as would be done in hand tapping when the strain on the tap is too great. The backing up, or oscillation, works like a flash, and only when it is necessary to prevent tap breakage. The load on the tap is carried by a cushion coil spring which deadens shocks on the tap, as well as on the entire machine.

The machine has been used to tap No. 29 wire drill holes in steel with 10-30 bottoming tap running at 800 r.p.m. It is unnecessary with this machine to use tapered taps to overcome tap breakage. This is advantageous because a tapered tap must be driven full length through the work, while a plug tap need be driven only two or three threads. When desired, an automatic indexing attachment for chucking and ejecting work is provided with the machine. The machines are arranged for both motor and belt drive, although the former is recommended. Among extras which are furnished are oil pump and piping, and air compressor for plants not equipped with air. Specifications are as follows:

	No. 4	No. 8
Capacity in steel, in.	⅛–⅝	¼–¾
Height over all, in.	60	70
Distance center of spindle to column, in.	9½	13
Diameter table inside oil channel, in.	15	22¼
Vertical adjustment of table, in.	20	21
Spindle speeds, r.p.m.	340	195
Spindle speeds, r.p.m.	520	275
Spindle speeds, r.p.m.	800	390
Spindle speeds, r.p.m.	...	670
Spindle travel, in.	2¾	3
Highest position of table from floor, in.	36	41
Lowest position of table from floor, in.	16	20
Motor, hp.	½	1½
Weight, lb.	375	850

British Pig Iron and Steel in August

LONDON, ENGLAND, Sept. 18.—(*By Cable.*)—The pig iron and steel production in August showed a decline from July and a further decline from the heavy output in May, the peak of the year. In August 599,800 gross tons of pig iron was made, which compared with 655,100 tons in July. The steel ingot and castings output in August was 582,700 tons, a decrease of 41,600 tons from July.

Comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	639,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,900	767,700
July	655,100	624,300
August	599,800	582,700

Plant Operations at Birmingham

BIRMINGHAM, ALA., Sept. 17.—Repairs in the blooming mill of the big Ensley plant of the Tennessee Coal, Iron & Railroad Co. are about completed and the entire plant will shortly be going at the pace that has been found necessary for some time. With the blooming mill out, practically all departments have been running slow.

The Gulf States Steel Co. now has four out of six open-hearth furnaces in operation and has all finishing mills going. Expectations are for strong demand for various shapes in steel. No Japanese business has been placed here lately. The Tennessee company is receiving its steel barges to be used in the Warrior River service between the Birmingham district and the port of Mobile. The last of the nine barges will have a hauling capacity of 1300 tons and will be able to carry a good sized cargo of steel products from this district to Mobile.

Vanderbilt blast furnace of the Woodward Iron Co. has been blown out because of lagging iron market, leaving three furnaces still in blast. Alabama now has only 23 furnaces making iron.

CORRESPONDENCE

Continuous Wire-Drawing of Steel*

To the Editor: Perhaps there is no industry about which so little is known by the general public as the production of steel wire, which enters so largely into every day use. It is a cold process when being drawn. The art of wire drawing is very old and the drawing is still accomplished in about the same manner and by such machines as were used hundreds of years ago.

A wire drawer who has been brought up in a wire mill, asked why he does this or that operation as he does, would probably answer: "Father and grandfather did it this way, and this is the way we always do it." If one should suggest some newer method designed by a mechanical engineer who did not happen to be brought up in a wire mill, the reply would likely be: "He knows nothing about wire drawing; he was not brought up in a wire mill. He was in one only a short time, while I have been all my lifetime in the mill and know all about wire."

These people seem to think there is some unseen or subtle cause of various troubles encountered which can be learned only by a lifetime spent in the presence of the old-fashioned machinery, and that nothing but a long series of years can convey to men's minds sufficient knowledge to enable them to draw wire without spoiling the product.

About twenty years ago I took up the study of this subject and, through the courtesies of several mill owners, was given an opportunity to study wire drawing very closely. In conversation with various operators in different mills, I found there were many things that gave trouble that were hard for them to explain—some would attribute them to weather conditions and others to various other causes.

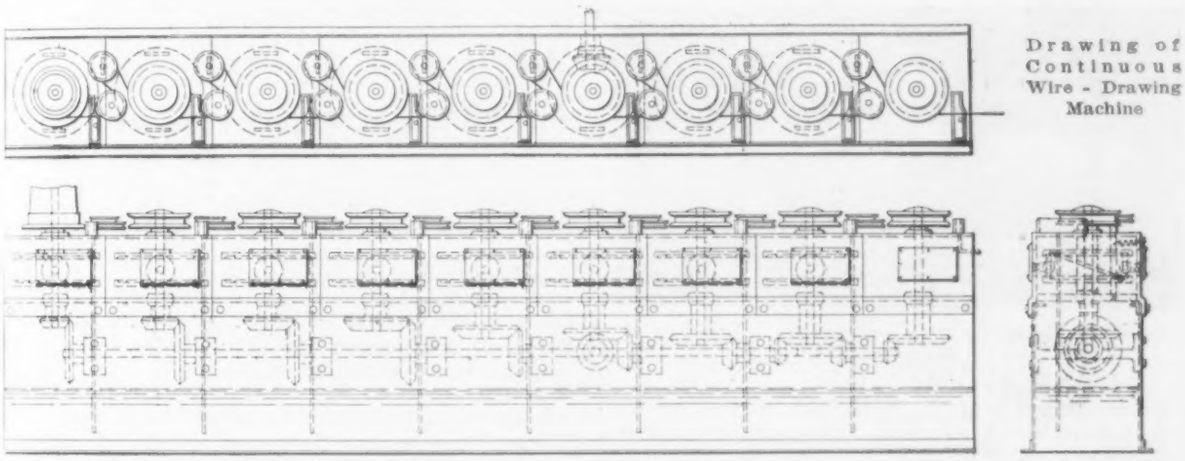
Up to this time I had been traveling selling machinery and, as some of my sales were wire-drawing machinery, I had become a student of wire-drawing. I also had opportunity to study the continuous drawing of brass and copper wire and had many discussions as to why steel wire could not be drawn successfully on machines adapted and extensively used for brass and copper. Always came the same reply: "It simply will not draw successfully on steel wire."

This caused me to study why and, after considerable time, I concluded it was because brass and copper were in themselves a source of lubrication and, as dies are usually steel or cast iron, copper and brass would pass through with a very small amount of lubrication, while steel would be scratched or roughed up with the same lubrication and be commercially spoiled.

Steel wire to be drawn is generally coated with a material which will adhere and remain on the wire during its passage through the die and remain on and intact for passage through several other dies. This coating is a mixture of hydroxide of iron, lime and soap or tallow, for "dry drawing," and coated with copper or copper and tin for wet or "liquor drawing."

These coatings will go through the die and remain on the wire through several dies, with the single draft system, but when the wire is put on a continuous machine, where the drums act as capstans to draw the wire through the die, and for reasons inherent in the process the wire has to slip on the drums, a portion of the coating is removed from that side of the wire next the drum and this will cause scratching or "slopping up" in the next and succeeding dies.

I found by experiments on a No. 5 rod drawn to No. 8 in one draft that, for ordinary steel, about 1200 lb. pull was required to pull the wire through the die. A machine which I patented, and which is in commercial use in Europe, has shoes in a groove as a wire forwarding seat. The shoes are formed in a ring just to fit the portion of the drum provided for them, said ring being cut into eight sections and lacking the saw kerfs of making a complete circle. They are retained in position but not attached to the drum and are driven by friction on the flat seat against which they are forced with the pressure produced by the winding on of the drawing wire at 1200 lb. strain in three wraps.



Drawing of Continuous Wire-Drawing Machine

These shoes, properly made in the right thickness, will travel only as fast as the wire that is on them and the slip will take place between the shoes and the drum. These machines were described in THE IRON AGE, Jan. 3, 1907, page 18, under the title "Wire Drawing: the Second Step in a Useful Art," by W. W. Gibbs.

In drawing steel wire by the continuous process the rods must be thoroughly cleaned to remove all the black oxide of iron that is the product of hot rolling, carefully coated with hydroxide of iron (brown coating), then with lime coating, then baked to remove the hydrogen gas and to dry on the lime coating.

This coating, when combined with the soap by the heat generated in the die, will pass through four or more dies unless removed by scraping through guides or drawn over the hard surfaces in its passage from one drum to the next succeeding drum. In liquor drawn wire, and most fine wires, the wire is coated with copper and tin and, from the nature of the process, must be kept in liquor after coating until drawn or it will rust.

The necessity for a non-slip machine of the continuous type was recognized by the writer, hence the shoes described. But the control of the speed of the various drums to suit the tension of the wire has to be accomplished by the excess strength of the wire being drawn, over the amount of pull necessary to draw it

*Patent No. 1,460,379, dated July 3, 1923, has been issued to James A. Horton, Worcester, Mass., on a continuous wire-drawing machine of the non-slip variety. An illustration herewith is adapted to draw the finer sizes of wire, but the patent applies also to coarser sizes of steel wire. The claims in this patent are very broad and some are basic in effect. For instance, Claim 3—"In a wire-drawing machine, a source of power, a die, a drum around which wire passing through said die is wrapped, a yielding transmission means between the source of power and the drum, adapted to permit lagging of the drum with increase in tension of the wire, means controlled by such lagging for altering the speed of the drum, and provisions for adjusting the tension of said yielding transmission means."

through the die. In the finer wires this excess is only a few pounds and in the machine illustrated it is only a matter of ounces to do the regulating.

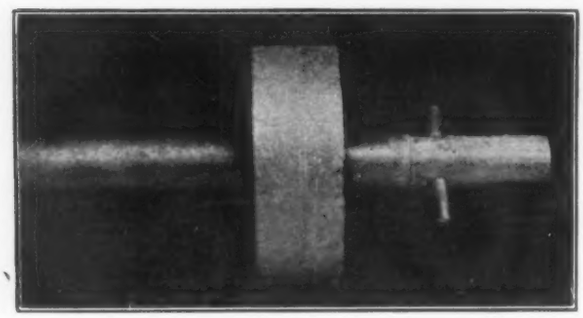
It will be seen from the foregoing that I produced a non-slip machine for drawing rods over twenty years ago and, in experimenting, I drew coils of rods (made special) weighing 610 to 615 lb. each from No. 5 rod to No. 14 wire through fine dies in one continuous pass in 48 minutes, dies and drums being water cooled.

JAMES A. HORTON,
Mechanical Engineer.
45 Abbott Street, Worcester, Mass.

Taking Bulges Out of Tube Ends

To the Editor: Restoring the ends of tubing that has sustained dents and bulges is an operation so often necessary that the rectifying method illustrated may be of interest.

Where this was applied a pile of brass tubes had lain a considerable time with one end extended beyond the racks, and on this end only they were found to be



Device for Rectifying Dents and Bruises in the Ends of Brass Tubes

all more or less bruised. With both internal and external diameters a standard size it was not difficult to procure a heavy collar to fit the outside and a short piece of bar stock for the inside of the tubes. The only work required was to grind a short taper on the end of the bar, drill a hole through it sideways and drive a pin through. The method of operating the device was first to drive the solid bar into the tube end in order to straighten out the inner bulges, and then to slip the collar over the other end and drive it over the end with the bar inside.

In this way the end of the tube was drawn out as straight as it was originally without showing marks of the operation. It may be seen that the object in having the cross pin in the solid bar piece is to permit its easy removal from the tube. As the collar piece is driven over the end it comes against the pin and carries the bar piece out with it.

HARRY MOORE.
Rosemount, Montreal, Canada.

The Ohio State Foundrymen's Association, Cleveland, announces the addition of the following members to its roster: Baker Brothers, Bunting Brass & Bronze Co., Donovan Wire & Iron Co., Ensign Foundry Co., Etna Machine Co., Merrell Mfg. Co., National Supply Co., Toledo Machine Tool Co., Toledo Ship Building Co., Toledo Steel Casting Co., Toledo Steel Products Co., all of Toledo, and American Rolling Mill Co., Ashland, Ky., division.

Consumption of timber in the mines of the United States has practically doubled within the past 20 years, while the cost has in some districts increased three to five times, according to the survey of the mine timber situation just completed by the Department of the Interior through the Bureau of Mines. So completely has the supply in some regions been used that the cost of freight to the mines equals the cost of the timber at the point of shipment.

The Standardization of Stove Bolts and of Taps and Dies

A meeting of the National Screw Thread Commission, of which the Director of the Bureau of Standards is chairman, was held in Swampscott, Mass., on Aug. 7 and 8. In connection with this meeting, conferences were held with representative manufacturers of stove bolts and of taps and dies. There is at present a lack of uniformity in specifications for stove bolts as manufactured in the central West, notably Cleveland, Ohio, and as manufactured in New England. The commission desires to assist manufacturers and users of stove bolts to arrive at a single standard, so that the product of various manufacturers will be completely interchangeable. It is hoped that this may be accomplished through the interest of users of these bolts who are now put to unnecessary expense and inconvenience through lack of interchangeability.

The conference with manufacturers of taps and dies was arranged with a view to bringing into harmony the commission's report and the manufacturers' standards for threaded products. The conference resulted in satisfactory progress toward the settlement of minor differences between the commission's recommendations and the standards of the manufacturers.

Gases in Malleable Cast Iron

Analyses for oxygen, hydrogen and nitrogen have been completed on samples of hard white iron and malleable iron from two plants melting in electric furnaces and from those plants melting in air furnaces. In all cases it was found that the annealing of the hard iron increased the oxygen content of the metal and decreased the nitride nitrogen content. No distinction between air furnace and electric furnace iron was found on the basis of the oxygen content or on the basis of the changes in oxygen or nitrogen. There was apparently in some instances a tendency for electric furnace iron to contain more nitrogen than air furnace iron in both hard and annealed conditions, but this difference was not true throughout the series of samples analyzed. The ranges of gas contents were as follows: Oxygen in hard iron 0.0014 to 0.0043; oxygen in malleable iron 0.0060 to 0.0190; nitrogen in hard iron 0.0080 to 0.0104; nitrogen in malleable iron 0.0011 to 0.0036 per cent.

Fatigue Properties of Steel

The Bureau of Standards is carrying out an investigation on the fatigue properties of various woods and metals and in connection with this work 26 specimens of 3.50 per cent nickel steel have been tested in the rotating beam fatigue machine by the load deflection method. The results are consistent for the different heat treatments to which the metal had been subjected. Fatigue values of from 50 to 55 per cent of the ultimate strength were obtained when the proportional limit was above that of the fatigue limit. When the proportional limit of the material was less than 50 per cent of the ultimate strength, the fatigue limit was less than the proportional limit. Fatigue tests by the load deflection method have also been made in a rotary beam fatigue machine on three specimens cut from a Thermit-welded rail joint. The fatigue limit averaged 31 500 lb. per sq. in. with an average ultimate strength of 57 445 lb. per sq. in., the average percentage of the fatigue limit to the ultimate strength was 54.9.

"Reactivity of Coke in Relation to Blast Furnace Operation," was the subject of a joint paper by George St. J. Perrott, assistant physical chemist, and Ralph S. Sherman, assistant physicist, U. S. Bureau of Mines, Pittsburgh, presented at the bi-monthly meeting Steel Works Section, Engineers' Society of Western Pennsylvania at the William Penn Hotel, Pittsburgh, Tuesday evening, Sept. 18.

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THE IRON AGE

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The Mind of Business

IT is well nigh a platitude to say that reactions in business are psychological. It would be as much a platitude to say that business revivals are psychological, but that is something we do not say, for we regard business activity as something very "substantial" and we do not so think of mental attitudes. Yet it is not what is, but how men appraise what is, that determines business conduct. Hence there is a psychology factor in all business equations.

Observation of the mental factor may be made by scrutinizing the causes of the various panics and industrial depressions we have had. There is an accepted list of causes, and for each panic or depression the authorities have picked out those that were present. In but one case were all the causes so found, one of the foremost writers on this subject stating that the panic of 1873 was unique in that respect. We should find some of the causes present when there is no depression, but we are careful to avoid such inquiries.

The psychological side can be observed also in the recurrent presentations by financial writers of the "favorable" and "unfavorable" factors in the existing situation. It is good form in financial journalism, by the way, to arrange the points in such a way that there shall be one more favorable than unfavorable factor. It is easy to state the facts correctly, but sometimes business grows better and sometimes it grows worse, depending simply on which group of factors is given the greater weight in men's appraisals, and that is mental.

Continuously during the present period of activity men have been asking themselves what would occur to destroy the activity. The usual causes have been conspicuous by their absence, if we throw out of the reckoning, as we certainly should, those alleged causes that were in existence when the present activity was succeeding to inactivity.

This inquiry is itself more or less unique. In the past it has been the common thing to ignore the existence of unsound conditions until too late. The obvious explanation of the present search for unsound conditions is that of late "the business cycle" has received such extensive advertising that many think the time has arrived for something to go wrong.

The complicated machinery of business can be easily disturbed. It can be disturbed by men concluding that poorer times are coming, when the conclusion does not rest upon physical facts, just as well as when the conclusion is based upon material conditions. The great danger to American business today is not so much unfavorable conditions as a disposition to expect unfavorable conditions.

"Economic" Brayings

"THE 'economic war' will not end until business abandons the present predatory methods and unites with producers and consumers of the country in sharing with them their just rewards," Senator Brookhart declared in a recent address, wherein he proceeded to say: "Capital is taking a vast toll of labor, and this, with the decreased earnings of the farmers, renders laboring men and farmers natural allies. Out of the dollar labor pays for the products of the farm, the farmer gets 37 cents, as officially reported by the joint committee of Congress. Out of the dollar the farmer pays for the products of labor, the laboring man gets even less. The last fact is disputed, but I think it substantially correct."

There is one admittedly impartial fact-finding body in the United States—the National Bureau of Economic Research. Its findings are passed upon by a board of directors who are selected as exponents of all kinds of interests and thought. That bureau has reported that out of the produce of mining, manufacturing and transportation industry, labor gets about 70 per cent and capital together with management (which means the executives, the engineers and other professional men, and their staffs who run things and without whom there would not be much produce at all, as the Russian Soviets learned to their sorrow) get only 30 per cent.

This finding was studied and expressly approved by the entire board of directors of the bureau, including Gray Silver, representing the American Farm Federation Bureau, and Hugh

Frayne, representing the American Federation of Labor.

When, therefore, Senator Brookhart makes a statement to the contrary he is setting himself above science and above the most intelligent and most impartial thought of America. In fatuously admitting that what he alleges to be fact (which it is not) is disputed, he ought to explain that among those who dispute it are Mr. Silver and Mr. Frayne, who sit specifically as representatives of organized farmers and organized laborers.

If Senator Brookhart is going to pose as an economist he might go further, without making any great draft upon intelligence. He might compare the amount of the national income as reported by the authority we have cited—again with the assent of Messrs. Silver and Frayne—and the aggregate sums paid to railroad labor, as reported by the Interstate Commerce Commission, and see how railroad labor has been taking an increasing share, of course at the expense of other people and largely of the farmers.

What shall we think of the intellectuality that lets Senator Brookhart and others of his ilk say such things? It would be hard to say which it should more provoke—pity or contempt.

Oxygen in Steel Metallurgy

IN most major chemical reactions satisfactory results are assured when the various reagents are in concentrated form. In steel metallurgy, oxygen, one of the most active factors in the manufacture of pig iron and steel, necessarily has been employed greatly diluted with nitrogen. Tons of an inert useless gas are daily blown through modern blast furnaces or pass through steel melting furnaces. It has been recognized for a long time that if oxygen were available at a reasonable cost, radical and beneficial changes might result from the use of a more concentrated blast or one higher in oxygen. Interest in this subject was aroused by Dr. F. G. Cottrell and the late J. E. Johnsen, Jr.

The Bureau of Mines created a few months ago a committee of well-known metallurgists and scientists to investigate further the possibilities of oxygen or oxygenated air in metallurgy. The first report has been made public, abstracts appearing in THE IRON AGE last week and this week. While the conclusions are largely theoretical, they are such as to indicate that further investigation on a commercial basis is fully justified.

The high cost of oxygen has been one important deterrent to progress. The committee has been definitely assured, however, that cheap oxygen can be depended upon. The fact that members of the National Helium Board are part of the advisory committee practically assures the same success as to oxygen which marked the extraordinary results on helium.

With oxygen at less than $3 per ton well nigh a certainty, the investigators indicate, as among the possibilities, a decrease in the production costs of pig iron and the possible elimination of the hot blast stove, a better steel from the open-hearth and a more efficient production of ferromanganese, as a result of the use of more oxygen. It is probable that large scale experiments will confirm some or all of these probabilities and that important changes in steel and iron metallurgy will follow.

Still at the Mercy of the Union

AT the time of the settlement by union miners and operators in the bituminous field a year ago at Cleveland, THE IRON AGE spoke of it as "an ignominious surrender." The recent anthracite settlement at Harrisburg is a similar proceeding—of course, not so bad as the Cleveland surrender, by which the obnoxious check-off was continued, but in all other particulars quite as unsatisfactory. Nothing has been done to prevent another industrial struggle in two years and there is no assurance that the entire increase in cost of production will not be collected, as usual, from the consumers. Governor Pinchot has not forgotten his original proposition that the increased cost be divided among the operating companies, the railroads and the distributers; but there is little ground for hoping that the suggestions he has made to President Coolidge will have important results.

The United States Coal Commission has issued a document of about 7500 words, understood to have been prepared by former Vice-President Thomas R. Marshall, which sounds, in some of its paragraphs, more like a stump speech than the statement of conclusions based on thorough investigation. Familiar platitudes are given much space, and the report concludes by stating that "the legislative, judicial and executive branches of this Government must not permit a union of operators, a union of miners, nor a union of both, to become greater than the Union of the States."

The commission does not, however, propose any plan of preventing the continuation of the domination of the labor union. It does not recognize the plain fact stated in an editorial in THE IRON AGE of Aug. 30, that the United Mine Workers is an organization directed against the public welfare. It has not a word to say about the obnoxious license system under which the union prevents men from taking the place of union miners and thus completely controls the situation. The nearest it comes to recognizing the true character of the union is in expressing the opinion that Congress should compel full publicity from both operators and United Mine Workers to the end that the people of the United States may determine whether they will longer permit the existence of these organizations.

The report declares that if other methods fail "it is the solemn duty of the Congress of the United States to assume jurisdiction over American rights, bringing the full power of the Union to their preservation by the prosecution and conviction of all persons, whether high or low, who shall dare to violate them." But Congress can hardly be expected to stand up for American rights when employers and employees in joint session with the Governor of a great State fail to

do so. Recalling again the words of the late President, we are still "at the mercy of the United Mine Workers."

Coke in 1922

OF the coke produced in 1922, the proportion of by-product coke was remarkably high through a combination of three influences: 1. In general, by-product coking is increasing while the beehive process is decadent. 2. Demand was relatively light early in the year, affecting beehive more than by-product coke. 3. The coal strike, April to August, affected beehive more than by-product coke production, as shipped coal from mines not closed by the strike went to by-product rather than beehive ovens.

Final figures of coke production in 1922 were recently stated by the Geological Survey, at 8,573,467 net tons of beehive and 28,550,545 net tons of by-product, making a total of 37,124,012 tons. The proportions were thus 23.1 per cent beehive and 76.9 per cent by-product. The percentage of beehive coke was larger in 1922 than in 1921, for in 1921 total demand had been very light and the beehive ovens suffered correspondingly. They contributed only 21.8 per cent to a total which was but 69 per cent of the 1922 production.

Beehive coke is largely a merchant production, while by-product coke is made chiefly for owner consumption. There is, however, a trend toward the building of by-product ovens for making merchant coke. Further growth of by-product coking must be largely in this direction, for the greatest consumer, the blast furnace industry, has already gone far in building by-product ovens. In 1922 coke consumed by the producers was 1,071,886 tons of beehive, or 12.5 per cent of the total beehive, and 21,106,823 tons of by-product, or 74 per cent of the total by-product.

The influence of last year's coal strike in curtailing production of beehive coke cannot be gaged, since the demand for blast furnace operation so increased during the strike that it cannot be conjectured what the beehive production would have been had there been no strike. Beehive coke production was 781,000 tons in March, the month before the strike, dropping to 465,000 tons in May, on account of the strike, and reaching 935,000 tons in October, when the influence of the strike had been lost, so that the post-strike output was much beyond that preceding the strike.

Unfortunately the reports do not give the value of the by-products, chiefly gas, used by the coke producers. The total value of all by-products sold is given at $83,387,763 for 1922, including gas sold to steel and other affiliated plants, or $2.92 per ton of coke produced. This is a tidy sum, but must not be regarded as profit since expense was involved. It does represent, however, a recovery of material that would have been lost had the beehive process been used. A further saving was involved in that the yield of coke from coal was 69.5 per cent in the by-product process, against 64.5 per cent in the beehive process. The value of the coal used being reported, it can be computed that extra coal to the value of 53 cents per ton of coke produced would have been required had the yield been 64.5 instead of 69.5 per cent. This added to the $2.92 just mentioned makes $3.45. The by-product coke itself was valued at $6.60 per ton.

Using Manganese Ore Stocks

TO Aug. 1, American blast furnaces had produced in 1923 over 170,000 gross tons of ferromanganese, according to returns to THE IRON AGE. Theoretically this would require the consumption of about 425,000 tons of high-grade manganese ore. To meet this, however, only a little over 101,000 tons of ore had been imported to Aug. 1, according to official data, or an apparent deficiency of over 300,000 tons. Returns for 1920, 1921 and 1922 show that the ore imported in those three years, approximately 1,380,000 tons, was just sufficient, on the same theoretical basis, for the production of about 553,000 tons of ferromanganese. In the same three years the output of ferromanganese was 532,120 tons, or practically enough to consume the equivalent of the ore imported between Jan. 1, 1920, and Dec. 31, 1922. While these calculations are not exact, they would indicate on their face that the 1923 production of ferromanganese has eaten into stocks of manganese ore on hand at the opening of the year to the extent of 325,000 tons. This figure should be reduced by the amount of domestic manganese ore that has been charged this year into the furnaces producing ferromanganese. This latter factor is not known, but it is quite improbable that it is large enough to account for the marked decline in ore importations as compared with the rate of the three preceding years.

"Off Grade" Basic Iron

A RECENT sale of basic iron in the Pittsburgh area at a relatively low price on the ground that it was off in grade, since the silicon content ranged from 1.01 to 1.25 per cent, brings up the question what analysis constitutes standard iron. Published specifications long have recognized 1 per cent as the maximum silicon content in standard Northern basic iron; and as a matter of fact Southern and Eastern iron practice has set up the same limitation on this element. It is assumed that consumers had a voice in fixing the silicon in basic iron as well as in the other grades, and steel making practice of other years dictated a maximum of 1 per cent, probably because of the injurious effect of silicon upon furnace walls and bottoms. But steel works practice does not stand still and it is a fact that in the Pittsburgh area and farther west steel makers are showing a preference for basic iron containing more than 1 per cent of silicon, not a few asking for 1.25 per cent.

One reason for this development is that iron of the higher silicon content will carry a greater burden of scrap, and it is well known that beginning with the war period the ratio of scrap in the mix has been steadily increasing. There are several plants in which the charge of pig iron today is as low as 20 per cent and as against the old half pig iron and half scrap mix, the average in

important districts, according to competent observers, is about 65 per cent scrap and 35 per cent pig iron. Regardless of the reasons for the preference of steel makers for basic iron of higher silicon content, is it within the province of any producer to decide that iron running above 1 per cent silicon is off grade?"

This question is more apt to come to the surface in periods of dullness. It is argued, of course, that buyers cannot be so exacting as to analysis when the need for iron is pressing as they can be, and usually are, when producers want orders; but it is splitting hairs to say that an iron of a given analysis is "standard" when demand is good and "off grade" when the buying is slack. And with an increasing preference for iron above 1 per cent in silicon, is it not time for the formal revision of a specification that makes 1 per cent silicon the maximum for basic pig? Particularly so when an important Middlesbrough, England, furnace group produces a grade with a silicon range of 0.75 to 1.50 per cent.

Progress Toward Shorter Hours

THE report of one month's progress in abolishing the twelve-hour day, as made by correspondents of THE IRON AGE in this issue, clearly shows that those reformers who expected the change to be made quickly and easily were indeed in error, while iron and steel company operators who foresaw many difficulties did not exaggerate the size of the undertaking.

Some of the difficulties have indeed been greater than any of the operators had expected, but after a month it is certainly well within the truth to say that much has been accomplished by the Steel Corporation subsidiaries which have naturally been leaders, and that many of the independent companies are not far behind the Steel Corporation, while others are progressing very slowly and some have not made any move toward changing the hours of labor.

One effect of the change is seen in the hint that many of the iron and steel workers would be better satisfied if they had an opportunity to work in gardens or in other outdoor employment during their spare time. The desire of workers in various lines to get away from cities may result, in the case of the steel industry, in more plants being located in what are now strictly rural districts, following the example of companies located on the outskirts of various smaller cities in Ohio, as Warren, Massillon, and Ashtabula. Such a change is greatly to be desired.

An important feature of the movement away from the long hours is that the short shift is becoming popular among the better classes of workmen—the men who prize their home life, know how to enjoy healthful recreation and are willing to sacrifice a little in wages in order to obtain the better living conditions.

While it is noteworthy that the readjustment to ten and eight hours is being made more slowly now than it was a month ago, it does not follow that the change will be further retarded in the next few months. Much depends upon the state of employment. Naturally, at this time of the year, workmen are attracted from various outdoor employments to the mills, and if mill activity should decrease even to a moderate degree in the next three months there would be plenty of labor available and the readjustment to shorter hours would be easily made. If, however, mill activity continues on the present basis and negroes in considerable numbers return this winter to the milder climate of the South, the transition to the shorter day will not be so easy.

ALTHOUGH imports into the United States in the first half of 1923 were 47 per cent greater than in the first half of 1922, the increase in manufactured goods ready for consumption was slight, most of the gain being either in foodstuffs or in materials for manufacturing. Under the latter heading the $731,000,000 of 1922 gave place to $1,210,000,000, a gain of 65.5 per cent, while all imports except those destined to be processed in our factories show an increase of only 27.6 per cent, advancing from $688,000,000 to $878,000,000. Thus the goods entered as raw materials or partly finished for further use in manufacturing represented this year 57.9 per cent of the total value of all imports, compared with 51.5 per cent last year.

The Iron Age and Its Readers

AS new uses of steel are developed or promising avenues seem to open up for the enlargement of a present use, THE IRON AGE has been prompt to give the facts to its readers.

Some months ago we pointed out how in providing new or repaired freight cars with a form of corrugated steel door, the consumption of sheets could be increased easily by 350,000 tons a year.

A little later we gave an estimate of the tonnage of steel bars now going in increasing quantities into concrete road construction.

And in last week's issue was described at length the making of a variety of bedroom furniture in steel which is being so well received that an enlarged plant now building will take steel at the rate of 225,000 lb. a day, or, in a year's time, upward of 20,000 tons of sheets and 13,500 tons of strip steel.

THE IRON AGE analysis at the opening of the year of the steel production of 1922 was useful to the same end in giving both the amounts of the different forms of steel rolled by the mills and the quantities taken to be worked up by different industries. Numerous were the ways in which these exhibits were studied for their bearing on sales policies in 1923 or in initiating new programs for disposing of steel.

FRENCH MARKET RISES RAPIDLY

Receipts of Ruhr Coke Small—Export Demand Good—Pig Iron Production Small

PARIS, FRANCE, Sept. 6.—Prices are still moving upward and the increase is progressing so rapidly that there is some anxiety as to the future standing of the market, it being feared that an exaggeration of prices at this time would affect business badly. A rise in the price of coke is expected on Oct. 1. Although no official information is available, it is said that this advance might be as much as 30 fr. per ton. As a consequence, revisable contracts based on coke prices are again in use.

In addition to the anticipated increase in coke prices, fear is felt that there will be a shortage of the fuel needed to meet the demands of increased output and the fluctuations of exchange may also prove serious. On the other hand, the increase of exports has produced a domestic shortage which enables producers to advance prices.

Coke.—The latest statement issued by the Office des Houilleres Sinistrées, in charge of the distribution of indemnity fuels in both France and Luxemburg, advances the price for German coke to 388 fr. per metric ton. It is noteworthy that this coke was still quoted at the beginning of July at 72.67 fr. per metric ton. Week by week this price has successively been 98.50 fr., 124.84 fr., 203.32 fr., 264 fr. and now 388 fr. In the last four days of August, 18,870 metric tons of Ruhr coke was received, making a total for the month of 120,000 tons. There has been an improvement in arrivals but the daily average was only 4000 tons during the month. For the first four days of September the daily average was 4600 tons.

Pig Iron.—Sales are limited and production is small with prices moving upward. No. 3 P. L. is quoted at 420 fr. at works and No. 3 P. R., 1.80 to 2.25 per cent sil., at 410 to 415 fr. No. 3 G.m.b. pig iron, with the pound sterling at 80 fr., is not yet a dangerous competitor in the domestic market, but there is but little opportunity at present of selling into British markets. Hematite pig iron is firmer and very few lots are available for prompt shipment because of the numerous orders booked ahead. These orders have generally been at about 500 to 525 fr. per metric ton, delivered, with a clause in the contract permitting a revision of price based on the variations in the cost of coke. This situation is evidently favorable to British transactions in hematite, which is quoted in the Paris market at 510 to 515 fr. per metric ton. For export, the following prices per metric ton, f.o.b. Antwerp are quoted: Casting iron, No. 3, 465 to 475 fr. (Belgian currency); ordinary basic Bessemer, 455 to 465 fr. (Belgian currency).

Ferroalloys.—The tendency of the ferroalloy market is decidedly upward. Ferromanganese, 70 to 80 per cent, is quoted at 1600 fr. per metric ton. Ferrosilicon shows increases for various percentages of from 25 to 100 fr. per metric ton, 25 per cent being quoted at 775 fr. Spiegeleisen, 18 to 20 per cent, is quoted at 750 fr., an advance of 50 fr. per metric ton.

Semi-Finished Material.—Prices are advancing and deliveries offered are being extended. Export demand is reported active, which has resulted in some scarcity in the domestic market and fluctuations in prices. In basic material, ingots are quoted at 48 to 50 fr. per 100 kg., blooms at 52 to 54 fr. per 100 kg., and billets at 56 to 58 fr. per 100 kg. Open-hearth material is from 2.50 to 3 fr. higher.

Rolled Products.—Much the same situation prevails in this market as in the market for semi-finished materials. The lowest base price is now 62 fr. per 100 kg., but quotations generally average 63 to 65 fr., at works. Beams (light) are quoted at 60 to 63 fr. per 100 kg., according to size. For export, f.o.b. Antwerp, the following prices are quoted in Belgian currency: Bars, 775 fr., small shapes, 785 fr., and light beams, 725 fr. per metric ton.

Sheets.—The market shows an increase in price of from 2 to 3 fr. per 100 kg. Prices in the domestic market are as follows for basic steel: Heavy plates, 66 to 68 fr. per 100 kg.; heavy sheets, 67.50 to 70 fr.; medium sheets, 80 to 90 fr. and light sheets, 95 to 100 fr. per 100 kg. Lorraine works are quoting sheets for export, f.o.b. Antwerp in Belgian currency, at 780 fr. per metric ton, for 5 mm. and heavier and 850 fr. per metric ton for 3 mm.

JAPAN NOT YET ACTIVE

Inquiries for Sheets and Wire Nails and Some Business Placed—Light-Gage Galvanized Sheets Too High

NEW YORK, Sept. 18.—In contrast to the numerous rumors of heavy purchasing by Japan of temporary reconstruction materials, the export market with the Far East is extremely quiet thus far. Some fair activity in wire nails and light gage black sheets is noted, but most of the export houses which conduct business with both Japan and China complain of delay in cables, believed to be a result of the reported congestion of messages because of the earthquake in Japan. Exporters to Chinese markets also mention a considerable interruption of cable service with Shanghai. Chinese merchants are inactive with the exception of light buying of wire shorts and a few orders for cut nails. One exporter to the Far East reports an order for 1000 tons of cut nails from China. One large Japanese export house has booked in the past week orders for 1000 tons of light gage black sheets and several thousand kegs of wire nails.

Whether prices of American mills on the materials needed by Japan for this reconstruction will prove too high to compete with other foreign sellers remains to be seen. And the possibility of extended payment is a factor. In addition to the difficulty encountered by exporters in obtaining quotations on the Nos. 30 and 31-gage galvanized sheets recently asked for by Japanese merchants, the prices that were received were regarded as rather high. One exporter found that the best c.i.f. quotation he could make on these light-gage sheets was $143 per ton for four to five weeks' delivery.

While the Tokio office of the Imperial Government Railways was so completely destroyed as to necessitate removal of the company's headquarters to Osaka, it is now believed that damage to the company's lines was probably not nearly as great as originally estimated. Furthermore, with the company's reserve supplies in Japan and additional tonnage under order, not yet delivered, buying for replacement of damaged sections may be somewhat delayed. It is felt that purchasing of structural steel is still somewhat in the future and, although on important projects American sections would undoubtedly receive preference, it is pointed out that with the present low value of the Belgian franc, Belgian makers are quoting below the American delivered price on structural steel, in some instances $45 to $46 per ton, c.i.f. Japan.

A report has been issued by the Department of Commerce, Washington, that the American built steel and reinforced concrete buildings in Tokio and the Yokohama district withstood the earthquake shock and are in good condition. It is pointed out that the fact that this construction has proved resistent to earthquakes is likely to influence favorably the adoption of this type of construction in the future.

President Julius Kahn of the Truscon Steel Co., Youngstown, states that his company has received information from Japan that the damage to its plant between Tokio and Yokohama as a result of the earthquake will approximate $100,000. The property was operated by a separate company, with many Japanese stockholders. It will be rebuilt as soon as possible.

Business Begins to Slacken in Germany

Introduction of Gold Mark Reckoning Brings Price Muddle and Lifts Quotations Above World Levels— Works Going on Short Time

BERLIN, GERMANY, Sept. 5 (*By Air Post to Bremen*). —The German industry is nearing a crisis. As all prices are fixed in gold marks the continual depreciation of the currency, which used to bring new orders every time the mark went down, has lost its power to act as a stimulus to business. Railroad rates have been heavily advanced recently and prices of raw material have in many cases reached foreign levels. Inquiries and orders in the metal and engineering industry are decreasing considerably and many smaller firms are already in difficulties. Wages and other expenses have gone up tremendously and many firms have trouble in finding sufficient ready capital to carry on. The home business is declining and export orders are also dwindling. Inland customers are in many cases trying to cancel their orders. Short time work and dismissal of employees are extending, though legal restrictions are allowing the dismissal of workmen only after the firm has worked short hours for some time.

The rapid changes that are taking place in the value of the mark are making the stipulations in regard to payment in trade and industry very complicated. The great number of different modes introduced is confusing and adds considerably to the difficulties in the home business in Germany at the present time. They are all introduced with the view to safeguard the seller against loss. In some lines quotations are in paper marks for a certain date and the amount varies with the exchange of the dollar. In others prices are given in gold marks or in foreign exchange, generally in dollars. Some firms take the dollar as 4 marks; others, as 4.2 marks.

Sharp Advances in Iron Prices

The Association of Iron Foundry Masters has increased prices considerably, and to such an extent that the new prices are, in gold, three to four times above pre-war quotations. The advances in prices have already led to a considerable decline in orders in almost all lines, and many firms are working short time. The larger firms, which have contracts extending over a longer period, have so far succeeded in keeping their men employed.

Demand for Siegen iron ore is diminishing and the mines are decreasing production. The Siegerland mills are fairly well employed in sheets and bar iron. Orders at the foundries, the sheet iron and construction works are declining. Some home orders were cancelled and very few foreign orders are booked. Conditions in the Solingen, Altenaer and Lüdenscheid iron industry are not improving. The electrical industry is meeting with a stronger foreign competition. Employment at the dock yards is also slackening. Some firms have dismissed up to 20 per cent of their employees as home and foreign contracts have fallen off considerably. The textile machinery factories are suffering at present under the quietness in the textile industry at home, and are mainly working for export. The automobile industry is expecting a decrease in sales owing to the heavy taxes recently imposed on motor cars and motor cycles.

The Pig Iron Association is now fixing prices in pounds sterling instead of marks, payable in paper marks at the exchange rate on the day of payment. Hematite, steel making iron low in copper, and foundry iron No. 1 and No. 3 are quoted at 122s. 6d. now, Siegerland steel making iron at 135s. and spiegeleisen at 190s. per ton.

Repeated Wage Adjustments

In order to reduce the differences in the industry about wages and salaries, the employers' associations and the trade unions have agreed to a system which is to take into consideration the full depreciation of the purchasing power that is taking place from week to week. The remunerations are to consist of a base wage which is fixed for a period of 4 to 8 weeks and a multiplier which is determined every week by a special committee in each district. The multiplier is determined from the cost of living index and any probable fluctuation is to be judged beforehand in order to compensate for a probable advance during the time till the next pay day. The wholesale price index and the exchange rate of the dollar are to be taken into consideration.

Owing to the catastrophal decline in the exchange the Federal Commissioner for Exports and Imports has given instructions that sales in paper marks to foreign countries require a special export permission now, which is to be granted in exceptional cases only.

As the Reichsbank has lately utterly been unable to provide sufficient paper currency, the scarcity of paper mark notes has become so acute that a large number of firms have printed their own notes in order to be able to pay their workmen. These notes are only valid locally, but as even small firms issued them, they are adding to the currency confusion existing, and the printing of some of them has now been prohibited.

Workmen have succeeded in enforcing the demand for a gold wage. The wage is differently calculated in different industries and districts; but in general is about equal to the pre-war wage. Last week with the dollar at around 4,500,000 marks, Berlin metal workers were drawing 750,000 marks an hour, or 6,000,000 marks a day, whereas until lately wages have seldom exceeded 50 cents a day. The price-rise of the past few weeks has been unprecedented. A fall in mark prices is considered impossible, and a fall in gold prices is highly improbable, because upon any further mark exchange decline wages, freight rates and other factors in costing will be automatically and immediately increased according to the new system of calculating in "gold marks," the real basis of which is the day's dollar quotation.

Convention of Iron and Steel Electrical Engineers

Papers to be read at the convention in Buffalo, next week, of the Association of Iron and Steel Electrical Engineers were listed on page 402 of THE IRON AGE for Aug. 16.

Sessions will be held from Sept. 24 to 28 in the Broadway Auditorium, Buffalo, with the show continuing for the five days, from 9 a. m. to 6 p. m. The grand opening will take place in the Auditorium at 2 p. m., Sept. 24, after the preliminary business session of the morning at 9:30 in the Hotel Statler.

Chicago Iron, Steel and Machinery Men Active in Relief Work

CHICAGO, Sept. 18.—The machinery and the iron and steel divisions of the Chicago Japanese Relief Committee went over the top in Liberty Loan style. The iron and steel division, of which Silas J. Llewellyn, president Interstate Iron & Steel Co., was chairman, collected approximately $25,000. The contributions to the machinery division exceeded that division's quota of $22,500 by 20 per cent. E. P. Welles, president C. H. Besly & Co., Chicago, was chairman of the machinery committee.

One Month's Progress in Reducing Hours

(*Continued from page 751*)

pressed by both the employer and the employees over the passing of the old order.

The district is very fortunate in the make-up of its workmen, as very few foreigners are employed, the men in nearly all of the mills being for the most part long residents of this section of the country, and good, solid, substantial property-owning citizens.

Fair Progress Made at Cleveland Plants

CLEVELAND, Sept. 17.—Fair progress has been made in the establishment of the 8-hr. day in the local steel plants since the inauguration of a shorter day a month ago, but not many merchant blast furnaces have as yet adopted the shorter day. Within the next month the shorter hours will probably be placed in effect by a number of Central Western merchant furnaces. In some of these the men are beginning to show uneasiness because of the delay in reducing their working hours.

The 8-hr. shift has now been adopted in all continuous operation departments of the American Steel & Wire Co., in which the men had been employed 12 hr. Following this change the company reduced from 12 to 10-hr. day men in the wire mills and other departments where men not engaged in continuous operation have been on the 12-hr. basis and advanced their pay, so that, based on the 40c. per hr. rate, they will receive 11 hr. pay, or $4.40 for a 10-hr. day. The McKinney Steel Co. has practically completed changing over from a 12-hr. to an 8-hr. day for continuous operations in its steel plant and River furnaces in Cleveland, but has made no changes as yet in the hours in its blast furnaces at Josephine and Scottdale, Pa., and Charlotte, N. Y. Men who have been working on the 10-hr. schedule in the McKinney plants in Cleveland have been granted a 10 per cent increase in wages.

Pickands, Mather & Co. have placed their Toledo, Ohio, furnaces and Perry furnace at Erie, Pa., on an 8-hr. day for continuous operations. The Stewart Iron Co., Ltd., has placed its Sharon, Pa., stack on an 8-hr. day. After the inauguration of the shorter day for continuous operations, the 10-hr. men at this furnace were dissatisfied because of the increased wage rate of the 8-hr. men and they were also placed on the 8-hr. day and given a 25 per cent increase in their hourly rate.

Several blast furnaces that have not yet adopted the shorter day have had under consideration the wage scale for their 10-hr. men. The late announcement of the Steel Corporation that its 10-hr. men will be paid for 11 hr. at the old rate, or an increase of 10 per cent, helps to clear up this situation, and it is probable that merchant furnaces, when they adopt the 8-hr. day will grant their 10-hr. men the 10 per cent increase.

Opinion among the workmen in the steel plants over the 8-hr. day seems to be somewhat divided. Some look with favor on the change and others would rather work the longer hours because of the increased earnings. Little difficulty has been experienced in securing additional labor necessitated by the shortening of the hours. This is largely due to the increased supply of labor that has resulted from a falling off in outside work with approach of winter and from the labor made available by shutting down of a number of blast furnaces. The announcement of the shorter hours has also attracted to the steel industry common labor that has been employed in other channels.

Workingmen Help in the Youngstown District

YOUNGSTOWN, Sept. 17—Another step in the elimination of the 12-hr. day in the iron and steel industry in this district was taken on Monday when several thousand men, unaffected by previous changes, were put on the shorter shift. With this last change but a small percentage of the 45,000 workmen employed by the industry in the Mahoning Valley are still working 12 hours. These will be changed gradually as more men become available.

The reduction of working hours and adjustment of wage rates as well as tonnage rates has met with the cooperation of the majority of workingmen. It can be stated with authority that what iron and steel property employees in this district now desire most of all is steady employment at satisfactory wages, which will enable them to maintain the American standard of living. They will not be susceptible to the influences of imported labor agitators, and any attempt to further organize the industry at this time would make little headway in his section. Workers have learned from bitter experience that the promises of the professional labor agitator are often more or less unreliable, and that the results to be gained from labor disturbances are sometimes questionable.

There appears for the time being to be an ample supply of men for nearly all needs of the industry. The somewhat extensive suspension af blast furnaces has created an additional supply of workmen for the active departments, and has also proportionately reduced the number of additional men otherwise required for introduction of the shorter work-day. Only in a few scattered cases is the supply of workers inadequate, and this involves mostly specialized skilled workmen.

Therefore, from the standpoint of labor, the situation in this district is very satisfactory. There are no evidences of labor unrest or agitation. Within the past five years, there has been inculcated in the minds of many workers in the industry a different attitude toward the employer. Old suspicions have been dissipated in many cases and the men appear to be more tractable and more disposed to listen to reason. It is felt that the employees' representation plan, as in effect at the plants of the Youngstown Sheet & Tube Co., has been in no small measure responsible for this changed attitude.

While it is true this attitude on the part of many workmen may be due to the fear that conditions are somewhat unsettled and employment may be more or less intermittent, there are those who contend that workers have been educated to the fact that cooperation with the employer will produce the best and most beneficial effects. This changed viewpoint on the part of many intelligent workmen is to be considered as a most significant step forward, and as a means of settling disputes which arise from time to time by conciliation rather than by strikes and walkouts.

On Aug. 16 the men who were affected by reduction in working hours were largely those employed in continuous operations, such as in blast furnaces, open-hearth and byproduct coke departments. Those affected this week are chiefly workers employed in pipe furnaces, tube mills and auxiliary departments and in bar mills.

In some cases, 12-hr. men are being reduced to 8-hr., while in others they are being cut to 10-hr. It is difficult to establish the three-shift plan with the present type of pipe furnace, explains a steel maker, and in consequence it was deemed advisable to establish the 10-hr. workday. Between shifts, it is necessary to make repairs to the bottoms of the furnaces, and to make other adjustments, which always cut into

the actual rolling time. In establishing the 10-hr. day, though, there is an increase in the idle time of the furnaces, with a possible decrease in production.

The Sheet & Tube company has established a 10-hr. day in its tube mills, with six day and five night shifts. This plan has worked to the satisfaction of the management as well as the employees. It is being adopted in similar respects by the Republic Iron & Steel Co. in the same departments.

The Carnegie Steel Co. has been gradually changing its 12-hr. workmen to a shorter day, until there are comparatively few in the Youngstown district who are still working 12 hours.

All men reduced from 12 hours receive an adjustment in wages or tonnage rates. Those who are reduced from 12 hours to 8 hours are paid a rate based on a common labor rate of 50c. per hr., while those changed from 12 hours to 10 hours receive wages on the basis of 44c. per hr. common labor rate. The 10-hr. workmen who had previously worked 10 hr. are paid for 11 hr. Thus where the hours are changed the management and the men divide the cost.

Easier Labor Conditions Help at Chicago

CHICAGO, Sept. 17.—An easier labor situation has made it possible for Chicago district steel producers to eliminate the 12-hr. shift much more rapidly than was anticipated. Some of the independent companies could probably complete the change to the new plan of operations before the close of the current month without difficulty, but they are purposely avoiding hasty measures, believing that safety considerations alone demand that a deliberate course be pursued. There are certain important tasks such as the operation of electric cranes that cannot be safely performed by green men without sufficient training. Notwithstanding the cautious policy of the industry in this district, considerable progress has been made towards the abandonment of the 12-hr. day and it would not be surprising if the change to the new regime is completed in the steel plants some time in October or November. The Inland Steel Co., for example, is now operating its blast furnace, coke oven and open-hearth departments on a three-shift basis and is organizing a third shift for its blooming mill department. Merchant blast furnaces in this territory, however, have not yet proceeded very far with the change in operations. Employees in the plants where the long day has been abandoned seem well satisfied, although there is no doubt that foreign white labor would prefer to work additional hours to obtain a larger day's wage. As a matter of fact, however, the organization of extra shifts has resulted in numerous promotions so that many men are earning as much and, in some instances, more per day than under the old scheme.

One of the difficulties of the present labor situation is the fact that mills must still depend to a large extent on negroes and Mexicans for common labor. According to operating officials, it takes at least three negroes to do the work of two white men. This is not due to the physical weakness of the negro, but the fact that he cannot be depended upon to work steadily. In the words of one mill officer, the negro will not work unless he is "broke." The Mexicans are absent from their work less frequently, but this is because they are always in debt. Their bent for gambling is even more pronounced than that of the negro and the result is that they are continuously without funds. The Mexican is apparently less able to stand hard physical exertion than the negro, however, and will not stay on a job unless he is permitted to rest periodically. While the mills make no attempt to conceal their preference for white labor, it is unlikely that they will be able to replace the Mexicans and negroes this winter. Although the labor situation in this district is easier, the first effect has been the sifting out of the less desirable men from the higher paid occupations. Foundries, for example, are finding it possible to discharge their negro help and replace it with white labor. The negro who finds that he cannot hold a semi-skilled job naturally seeks employment as a common laborer.

Moving Slowly at Buffalo

BUFFALO, Sept. 17.—Elimination of the 12-hr day in blast furnace and steel mill operation in this district is progressing slowly. Only one mill expects to have the new plan in full operation before Oct. 15. With reference to other furnaces and mills it will likely be Jan. 1 before schedules are worked out to the point that the 12-hr. shift can be abandoned.

Rogers, Brown & Co. have accomplished satisfactory steps to date and state that progress has been made without the addition of employees. To what extent the new schedule will require a larger force is yet to be determined.

The Lackawanna mills of the Bethlehem Steel Co. are working out new schedules and in conference with committees of plant representatives. Under the plan now under consideration, a maximum of 10 hours will be adopted. Both Mexican and negro forces are now employed in considerable number and are giving fairly satisfactory service.

Reduced blast furnace operation due to a slackening of demand, has reduced to a large extent the need of additional labor. The fact that little actual work is required of blast furnace laborers between blasts, and that elimination of the long day will reduce earnings, causes a question with the men as to whether or not they want any change in working schedules that would tend to reduce daily earnings.

Production Maintained in the Youngstown District

YOUNGSTOWN, Sept. 18.—Steel ingot production in the Mahoning Valley is being maintained at 85 per cent and there appears to be a more hopeful outlook in the pig iron market. The Struthers Furnace Co., operating a merchant stack in this district, is preparing to start the unit some time between Oct. 1 and 15. It was suspended owing to the stagnation in the iron market.

Operations in finishing iron and steel departments are holding up well. This week the Youngstown Sheet & Tube Co. is operating 21 sheet mills, and is planning resumption of its Empire plant at Niles. The Trumbull Steel Co. is operating its plant at Warren at a normal rate, with exception of four idle tin mills.

Of the 66 open-hearth furnaces in the Mahoning Valley, 56 are melting, while all Bessemer departments are in commission. The lowest steel-making rate at any plant is 80 per cent.

Of the 117 sheet and jobbing mills in the Valley, 80 were scheduled at the beginning of the week, a gain of two as compared with the previous week. Pipe mill departments are running close to normal.

The passenger steamer Greater Detroit, which is being built at the Lorain, Ohio, yards of the American Ship Building Co. for the Detroit & Cleveland Navigation Co., was launched Sept. 15. This boat is 550 ft. long, being about 50 ft. longer than the Seeandbee, at present the largest passenger boat on the Great Lakes. A sister ship, the Greater Buffalo, will be launched in October. Both vessels will be used on the Buffalo-Detroit route.

By the use of oil fuel in place of coal the steamship Mauretania has replaced 400 stokers by a fire room crew of 60. In the British Navy the change in the past nine years has been from 45 per cent oil burning to 90 per cent.

Iron and Steel Markets

CONSUMER WELL COVERED

Large Buying in Spring Months Reached Well Forward

Production Shows Further Contraction, With Price Trend in Buyers' Favor

The week has been a quiet one in all departments of the steel market. Consumers are getting such good service from both railroads and mills that deliveries of material bought in the first and second quarters of the year are sufficient for the needs of most of them. Meanwhile production both of pig iron and steel shows a further slight reduction. While prices of the major finished products are generally unchanged, the evident tendency is in the buyer's favor.

The extent to which many consumers provided for their wants in the strong buying movement of last spring appears from a canvass just made in Eastern territory by an independent steel company. About half the buyers who replied were covered for the remainder of the year. The other half expected to place further orders, but not immediately.

Among blast furnaces just blown out are one each in southern Ohio, Alabama and the Chicago district. Three at Cleveland, one at Erie, Pa., and two in the Shenango Valley will stop in the near future.

In the early inquiries for steel for Japan from New York export houses there were duplications. The Japanese Government is now moving to prevent speculation, and meanwhile warehouse stocks of nails, wire, sheets and pipe in China, Dutch East Indies, the Philippines and on the Pacific Coast are being taken up. Considerable orders are expected for replacing these stocks, and later a good demand for steel for the work of rebuilding.

London reports strong demand from Japan for thin galvanized sheets and British works are well sold out at advancing prices. Far Eastern buying of British black sheets continues also, and the works are booked until February-March.

Chicago mills, which until recent weeks were much congested, are now giving such service that Ohio and Pittsburgh mills are less able to get orders in that market on the score of better delivery.

Eastern plate mills show more marked effects of the shrinkage in new business. With one exception they have come to a 50 per cent operation and Eastern plates can be had at 2.40c., Pittsburgh, a concession of $2 per ton.

The semi-finished steel market has weakened, as indicated by a $40 price on a round lot of sheet bars at Youngstown, against $42.50 recently. A sale of several thousand tons of slabs was made at less than $42.50, Youngstown.

At Buffalo 2.40c., Pittsburgh, has been done on structural shapes, or $2 a ton below the common market. An Eastern mill which has sold at 2.40c. has gone to 2.35c.

With some 29,000 tons of fabricated steel and over 19,000 tons of new inquiries, the past week's business equalled that for the previous fortnight. So far September buying is practically up to the scale of August, which was 10 per cent better than July. New schools in New York were a large part of the week's awards.

Southern pig iron has shown marked weakness and some good sized sales have been made as low as $21, Birmingham, on which basis sales could be made as far north as Chicago. Furnaces making the lowest quotations later advanced, but iron is still obtainable at $22, Birmingham. In some centers in the North inquiry has been fair, with increased interest in deliveries for the first quarter of next year, but sales have not been large and prices are for the most part untested. Pipe works have bought a round tonnage of Southern iron, and at Philadelphia last week 4200 tons of British iron came in, most of it going to a pipe foundry.

It is evident that in New England, as elsewhere, some large buyers have pig iron stocks that will carry them through the year.

Blast furnace shutdowns, with attendant stopping of coke shipments, have been in such numbers as to cause heavy offerings of coke. Standard furnace grade has sold at $4.25, a reduction of 25 cents, bringing the market back where it was prior to the anthracite strike. The prospect of lighter industrial demand later in the year is seen also in lower prices for soft coal.

For the ninth consecutive week THE IRON AGE composite price for finished steel stands at 2.775c. per lb. It has not differed by more than 2 per cent from that figure in the past six months.

At $25.04, THE IRON AGE pig iron composite price is at the level of Aug. 7 and 14—the lowest for more than a year. One year ago it was $32.54, the highest since 1920.

Pittsburgh

Prompt Deliveries an Important Factor—Blast Furnaces Blowing Out

PITTSBURGH, Sept. 18.—Consumers of steel still are letting the railroads and the steel mills act in a warehouse capacity. The railroads are functioning so well and the mills are operating so smoothly that there is nothing to interfere with very prompt deliveries and consumers feel perfectly safe in going along with much smaller inventories than they would if there were any serious doubt about future supplies. That is one reason why there continues to be a marked absence of forward buying. Another is the belief that if prices are not going down in the near future, the possibility of an advance is even more remote. This sort of a demand means that mill backlogs are being steadily reduced

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 18, 1923	Sept. 11, 1923	Aug. 21, 1923	Sept. 19, 1922
No. 2X, Philadelphia‡	$26.26	$26.26	$25.76	$34.26
No. 2, Valley furnace†	25.00	25.00	25.00	36.50
No. 2, Southern, Cin'ti†	*26.05*	27.55	27.55	31.05
No. 2, Birmingham, Ala.†	*22.00*	23.50	24.00	25.00
No. 2 foundry, Chicago*	27.00	27.00	27.00	32.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	31.00
Basic, Valley furnace	25.00	25.00	25.00	34.00
Valley Bessemer, del P'gh.	28.26	28.26	28.26	35.77
Malleable, Chicago*	27.00	27.00	27.00	32.00
Malleable, Valley	24.50	24.50	24.50	34.00
Gray forge, Pittsburgh	25.76	25.76	25.76	37.77
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, furnace	*110.00*	112.15	117.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. sheet bars, P'gh.	42.50	42.50	42.50	40.00
Forging billets, base, P'gh.	47.50	47.50	47.50	45.00
O.-h. billets, Phila.	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.25	2.25

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.575
Iron bars, Chicago	2.40	2.40	2.40	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.60	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.25
Tank plates, Chicago	2.60	2.60	2.80	2.30
Tank plates, New York	2.84	2.84	2.84	2.49
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.70	2.20
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Sept. 18, 1923 Cents	Sept. 11, 1923 Cents	Aug. 21, 1923 Cents	Sept. 19, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.35
Sheets blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.00	$20.00	$19.50	$24.50
Carwheels, Philadelphia	21.00	21.00	20.00	23.00
Heavy steel scrap, P'gh.	18.00	18.00	18.00	21.00
Heavy steel scrap, Phila.	*16.50*	17.00	16.00	18.00
Heavy steel scrap, Ch'go.	*16.25*	16.50	16.00	18.00
No. 1 cast, Pittsburgh	22.00	22.00	21.50	24.00
No. 1 cast, Philadelphia	21.50	21.50	20.00	23.00
No. 1 cast, Ch'go (net ton)	20.00	20.00	17.50	21.00
No. 1 RR. wrot. Phila.	**20.00**	19.00	18.00	22.00
No. 1 RR. wrot. Ch'go (net)	*15.50*	16.00	14.00	17.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$4.25*	$4.50	$4.50	$11.50
Foundry coke, prompt	*5.25*	5.75	5.50	12.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*14.00*	14.12½	14.25	14.12½
Electrolytic copper, refinery	*13.37½*	13.62½	13.75	13.75
Zinc, St. Louis	*6.45*	6.55	6.45	6.65
Zinc, New York	*6.80*	6.90	6.80	7.00
Lead, St. Louis	**6.80**	6.72½	6.45	5.90
Lead, New York	**7.12½**	7.00	6.70	6.25
Tin (Straits), New York	*41.50*	42.12½	39.37½	32.12½
Antimony (Asiatic), N. Y.	7.50	7.50	7.62½	6.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Sept. 18, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Sept. 11, 1923,	2.775c.
Aug. 21, 1923,	2.775c.
Sept. 19, 1922,	2.419c.
10-year pre-war average,	1.689c.

Composite Price, Sept. 18, 1923, Pig Iron, $25.04 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 11, 1923,	$25.29
Aug. 21, 1923,	25.29
Sept. 19, 1922,	32.54
10-year pre-war average,	15.72

and, while that does not necessarily portend an early scramble for new business with attendant cutting of prices, it undoubtedly shows a further curtailment of production.

There has not yet been a very heavy loss of ingot production, but as an indication of how the future is viewed in the industry the continued suspension of blast furnaces is significant. October, on account of atmospheric conditions, usually is a favorable month for production and, if market conditions are right, the effort is made to keep the furnaces going. In the near future the Perry furnace, Erie, Pa., one furnace of the Otis Steel Co., Cleveland, and two furnaces of the McKinney Steel Co., Cleveland, are to be blown out while blowing out of the Claire furnace, Sharpsville, Pa., and the banking of one of the Shenango Furnace Co. stacks at Sharpsville, Pa., are early probabilities. The heavy tonnage products—bars, plates and shapes—show very little life in respect to new orders. The sheet market reflects mixed conditions, with some users specifying well and others able to get along on the tonnage still due on old orders. Tin plate and standard pipe show up well in the specifications and orders. Wire products are slow; indeed, the big drop last month in the unfilled orders of the Steel Corporation is said to have been in part ascribable to the reduced rate of new orders of the wire making subsidiary. No real weakness in prices yet has cropped out, but the market is rather in buyers' favor on black sheets, light rails, hot-rolled flats and most of the bar products.

In semi-finished steel $42.50 is now regarded by some buyers in the light of a premium price for prompt deliveries. A slightly better inquiry for pig iron is not productive of firmer prices, because stocks are heavy and buyers are doing little forward buying. The coke market is affected by blast furnace suspensions. Dealers with scrap to sell are experiencing much trouble in uncovering an outlet.

Pig Iron.—In the matter of sales the past week has been a very quiet one in this market. The largest individual sales reported were two lots of 500 tons of Bessemer iron; one to the Union Steel Casting Co., Pittsburgh, was at $26, Johnstown. The freight from Johnstown being the same as that from the Valley, this business was 50c. a ton below the Valley base.

Iron and Steel Markets

CONSUMER WELL COVERED

Large Buying in Spring Months Reached Well Forward

Production Shows Further Contraction, With Price Trend in Buyers' Favor

The week has been a quiet one in all departments of the steel market. Consumers are getting such good service from both railroads and mills that deliveries of material bought in the first and second quarters of the year are sufficient for the needs of most of them. Meanwhile production both of pig iron and steel shows a further slight reduction. While prices of the major finished products are generally unchanged, the evident tendency is in the buyer's favor.

The extent to which many consumers provided for their wants in the strong buying movement of last spring appears from a canvass just made in Eastern territory by an independent steel company. About half the buyers who replied were covered for the remainder of the year. The other half expected to place further orders, but not immediately.

Among blast furnaces just blown out are one each in southern Ohio, Alabama and the Chicago district. Three at Cleveland, one at Erie, Pa., and two in the Shenango Valley will stop in the near future.

In the early inquiries for steel for Japan from New York export houses there were duplications. The Japanese Government is now moving to prevent speculation, and meanwhile warehouse stocks of nails, wire, sheets and pipe in China, Dutch East Indies, the Philippines and on the Pacific Coast are being taken up. Considerable orders are expected for replacing these stocks, and later a good demand for steel for the work of rebuilding.

London reports strong demand from Japan for thin galvanized sheets and British works are well sold out at advancing prices. Far Eastern buying of British black sheets continues also, and the works are booked until February-March.

Chicago mills, which until recent weeks were much congested, are now giving such service that Ohio and Pittsburgh mills are less able to get orders in that market on the score of better delivery.

Eastern plate mills show more marked effects of the shrinkage in new business. With one exception they have come to a 50 per cent operation and Eastern plates can be had at 2.40c., Pittsburgh, a concession of $2 per ton.

The semi-finished steel market has weakened, as indicated by a $40 price on a round lot of sheet bars at Youngstown, against $42.50 recently. A sale of several thousand tons of slabs was made at less than $42.50, Youngstown.

At Buffalo 2.40c., Pittsburgh, has been done on structural shapes, or $2 a ton below the common market. An Eastern mill which has sold at 2.40c. has gone to 2.35c.

With some 29,000 tons of fabricated steel and over 19,000 tons of new inquiries, the past week's business equalled that for the previous fortnight. So far September buying is practically up to the scale of August, which was 10 per cent better than July. New schools in New York were a large part of the week's awards.

Southern pig iron has shown marked weakness and some good sized sales have been made as low as $21, Birmingham, on which basis sales could be made as far north as Chicago. Furnaces making the lowest quotations later advanced, but iron is still obtainable at $22, Birmingham. In some centers in the North inquiry has been fair, with increased interest in deliveries for the first quarter of next year, but sales have not been large and prices are for the most part untested. Pipe works have bought a round tonnage of Southern iron, and at Philadelphia last week 4200 tons of British iron came in, most of it going to a pipe foundry.

It is evident that in New England, as elsewhere, some large buyers have pig iron stocks that will carry them through the year.

Blast furnace shutdowns, with attendant stopping of coke shipments, have been in such numbers as to cause heavy offerings of coke. Standard furnace grade has sold at $4.25, a reduction of 25 cents, bringing the market back where it was prior to the anthracite strike. The prospect of lighter industrial demand later in the year is seen also in lower prices for soft coal.

For the ninth consecutive week THE IRON AGE composite price for finished steel stands at 2.775c. per lb. It has not differed by more than 2 per cent from that figure in the past six months.

At $25.04, THE IRON AGE pig iron composite price is at the level of Aug. 7 and 14—the lowest for more than a year. One year ago it was $32.54, the highest since 1920.

Pittsburgh

Prompt Deliveries an Important Factor—Blast Furnaces Blowing Out

PITTSBURGH, Sept. 18.—Consumers of steel still are letting the railroads and the steel mills act in a warehouse capacity. The railroads are functioning so well and the mills are operating so smoothly that there is nothing to interfere with very prompt deliveries and consumers feel perfectly safe in going along with much smaller inventories than they would if there were any serious doubt about future supplies. That is one reason why there continues to be a marked absence of forward buying. Another is the belief that if prices are not going down in the near future, the possibility of an advance is even more remote. This sort of a demand means that mill backlogs are being steadily reduced

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 18, 1923	Sept. 11, 1923	Aug. 21, 1923	Sept. 19, 1922
No. 2X, Philadelphia‡	$26.26	$26.26	$25.76	$34.26
No. 2, Valley furnace†	25.00	25.00	25.00	36.50
No. 2, Southern, Cin'ti†	*26.05*	27.55	27.55	31.05
No. 2, Birmingham, Ala.†	*22.00*	23.50	24.00	25.00
No. 2 foundry, Chicago*	27.00	27.00	27.00	32.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	31.00
Basic, Valley furnace	25.00	25.00	25.00	34.00
Valley Bessemer, del P'gh.	28.26	28.26	28.26	35.77
Malleable, Chicago*	27.00	27.00	27.00	32.00
Malleable, Valley	24.50	24.50	24.50	34.00
Gray forge, Pittsburgh	25.76	25.76	25.76	37.77
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, furnace	*110.00*	112.15	117.50	67.50
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	40.00
Forging billets, base, P'gh.	47.50	47.50	47.50	45.00
O.-h. billets, Phila	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.25	2.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.575
Iron bars, Chicago	2.40	2.40	2.40	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.60	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.25
Tank plates, Chicago	2.60	2.60	2.80	2.30
Tank plates, New York	2.84	2.84	2.84	2.49
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.70	2.20
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Sept. 18, 1923	Sept. 11, 1923	Aug. 21, 1923	Sept. 19, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.35
Sheets blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75
Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.00	$20.00	$19.50	$24.50
Carwheels, Philadelphia	21.00	21.00	20.00	23.00
Heavy steel scrap, P'gh	18.00	18.00	18.00	21.00
Heavy steel scrap, Phila.	*16.50*	17.00	16.00	18.00
Heavy steel scrap, Ch'go.	*16.25*	16.50	16.00	18.00
No. 1 cast, Pittsburgh	22.00	22.00	21.50	24.00
No. 1 cast, Philadelphia	21.50	21.50	20.00	23.00
No. 1 cast, Ch'go (net ton)	20.00	20.00	17.50	21.00
No. 1 RR. wrot. Phila.	**20.00**	19.00	18.00	22.00
No. 1 RR. wrot. Ch'go (net)	*15.50*	16.00	14.00	17.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$4.25*	$4.50	$4.50	$11.50
Foundry coke, prompt	*5.25*	5.75	5.50	12.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*14.00*	14.12½	14.25	14.12½
Electrolytic copper, refinery	*13.37½*	13.62½	13.75	13.75
Zinc, St. Louis	*6.45*	6.55	6.45	6.65
Zinc, New York	*6.80*	6.90	6.80	7.00
Lead, St. Louis	**6.80**	6.72½	6.45	5.90
Lead, New York	**7.12½**	7.00	6.70	6.25
Tin (Straits), New York	*41.50*	42.12½	39.37½	32.12½
Antimony (Asiatic), N. Y.	7.50	7.50	7.62½	6.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Sept. 18, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Sept. 11, 1923,	2.775c.
Aug. 21, 1923,	2.775c.
Sept. 19, 1922,	2.419c.
10-year pre-war average,	1.689c.

Composite Price, Sept. 18, 1923, Pig Iron, $25.04 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 11, 1923,	$25.29
Aug. 21, 1923,	25.29
Sept. 19, 1922,	32.54
10-year pre-war average,	15.72

and, while that does not necessarily portend an early scramble for new business with attendant cutting of prices, it undoubtedly shows a further curtailment of production.

There has not yet been a very heavy loss of ingot production, but as an indication of how the future is viewed in the industry the continued suspension of blast furnaces is significant. October, on account of atmospheric conditions, usually is a favorable month for production and, if market conditions are right, the effort is made to keep the furnaces going. In the near future the Perry furnace, Erie, Pa., one furnace of the Otis Steel Co., Cleveland, and two furnaces of the McKinney Steel Co., Cleveland, are to be blown out while blowing out of the Claire furnace, Sharpsville, Pa.. and the banking of one of the Shenango Furnace Co. stacks at Sharpsville, Pa., are early probabilities. The heavy tonnage products—bars, plates and shapes—show very little life in respect to new orders. The sheet market reflects mixed conditions, with some users specifying well and others able to get along on the tonnage still due on old orders. Tin plate and standard pipe show up well in the specifications and orders. Wire products are slow; indeed, the big drop last month in the unfilled orders of the Steel Corporation is said to have been in part ascribable to the reduced rate of new orders of the wire making subsidiary. No real weakness in prices yet has cropped out, but the market is rather in buyers' favor on black sheets, light rails, hot-rolled flats and most of the bar products.

In semi-finished steel $42.50 is now regarded by some buyers in the light of a premium price for prompt deliveries. A slightly better inquiry for pig iron is not productive of firmer prices, because stocks are heavy and buyers are doing little forward buying. The coke market is affected by blast furnace suspensions. Dealers with scrap to sell are experiencing much trouble in uncovering an outlet.

Pig Iron.—In the matter of sales the past week has been a very quiet one in this market. The largest individual sales reported were two lots of 500 tons of Bessemer iron; one to the Union Steel Casting Co., Pittsburgh, was at $26, Johnstown. The freight from Johnstown being the same as that from the Valley, this business was 50c. a ton below the Valley base.

The Sterling Steel Foundry Co., Braddock, Pa., also was a buyer of 500 tons of Bessemer iron, paying $26.50, Valley furnace, and this sale preserved that figure as the Valley quotation. The Central Steel Co., Massillon, Ohio, is reported to have closed for 10,000 tons of basic iron with a Cleveland furnace interest with which it is allied, at $25, Valley furnace basis. No sales of consequence of basic grade have been made to Pittsburgh district melters in the past week, although there have been unconfirmed reports that the Allegheny Steel Co. has been buying small tonnages. Sales of foundry iron have been small again the past week, but considerable tonnage is pending and likely to be closed before the end of the week. The Standard Sanitary Mfg. Co., contrary to its usual practice of buying its requirements for three months at one time, is in the market for merely its October supplies for its local plant, which amount to about 2000 tons. The Westinghouse Electric & Mfg. Co. has not yet closed for approximately 7000 tons of foundry iron for its local and Cleveland foundries. The Conemaugh Iron Works, Blairsville, Pa., is in the market for 250 tons of foundry iron for the last quarter shipment. We make no change in quotations of the several grades this week, but it would be some exaggeration to describe the market as more than steady. Estimates are current that, including the steel company surpluses, stocks of iron on furnace yards in this and nearby districts are between 400,000 and 500,000 tons. This probably explains the inclination on the part of most buyers to confine their purchases close to actual requirements, presumably in the hope that the need of funds may force price concessions.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.00 to 24.50
No. 2 foundry	25.00
No. 3 foundry	24.00 to 24.50
Malleable	24.50 to 25.50
Low phosphorus, copper free	31.00 to 31.50

Ferroalloys.—Producers and importers of ferromanganese are making pretty strong efforts to interest consumers in supplies without much success. As low as $110, Atlantic seaboard, is being quoted, but even that price, which represents a further recession of $2.50 a ton, does not appeal to buyers, most of whom are well covered against their nearby requirements and are not yet satisfied that prices are as low as they are going to be. There is a quotation of $112.50 for small tonnages for prompt delivery, but we note no sales at that figure. The only recent sale of spiegeleisen involved 300 tons at $45 furnace for 19 to 21 per cent material for delivery over the remainder of the year. Prices are given on page 789.

Semi-Finished Steel.—If prices have a definite tendency, it is downward. While such business as has been done in billets, slabs and sheet bars has been at $42.50, the sales in most cases have been for very prompt delivery and, representing a pressing requirement, the advantage has been with the seller. The United Alloy Steel Co., Canton, Ohio, recently bought 1000 tons of sheet bars for delivery in one week at that price, and a Youngstown district steel company in the past week bought from a Pittsburgh maker between 4000 and 5000 tons of tin bar at $42.50, Youngstown. The only fourth quarter business which has been done here involves 25,000 to 30,000 tons of billets and slabs, also at $42.50, but with business in finished products on a moderate scale, interest in tonnages of semi-finished steel for the last quarter is limited and there is a feeling that lower prices are ahead, notwithstanding increased costs incident to the elimination of the 12-hr. day and the increases in wages. The market does not show much activity in forging billets or skelp and the only activity in rods seems to be in the shape of inquiries from exporters having Japanese connections. Prices are given on page 789.

Wire Products.—Recent improvement in orders for woven wire fence, it now develops, was a result of the fact that manufacturers recently inaugurated spring datings on business in this product. Business in wire products generally shows no appreciable increase and while new orders are fair in number, they fall far short of making good completed business. Jobbers are believed to have fairly generous stocks and there being no indication of higher prices in the near future, they are showing little inclination to anticipate their requirements. All makers in this district claim to be holding firmly at the quoted prices, but it is admitted that some business has been lost in nails on a quotation of $3 base per keg, and reports from the Middle West indicate some deviation from quotations. Very prompt delivery now is promised on all products except possibly manufacturers' wire and bale ties. Prices are given on page 788.

Steel Rails.—The local rail making subsidiary of the Steel Corporation now is busy lining up specifications for 1924 tonnages of standard rails and already has booked practically full rollings for the first half of the year. The market still is irregular on light rails. The two larger producers insist that the price is 2.25c. base and that orders are being taken at that figure. But there have also been sales at 2.15c. base for billet rails and on orders of a desirable character it is doubtful whether more now is obtainable. Rerolled rails still are quoted at around 2c. base. General demand for light sections is moderate.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Hot-Rolled Flats.—Demand upon the mills are not gaining much either in number or volume. Buyers not only do not expect higher price but actually seem to believe they will buy cheaper by waiting and their current purchases are governed accordingly. The prevailing quotation is 3.15c., base, for hoops, bands and strips, but on the latter product there are fairly frequent concessions, particularly in the wide sizes and on rim stock, which is generally quoted at 3c., base, and there still are some mills which want business badly enough to go as low as 2.90c. The full range of prices is given on page 788.

Iron and Steel Bars.—New business in steel bars is very light, but on such orders as are being placed there is no deviation from the regular base of 2.40c., Pittsburgh. Contract buyers are specifying fairly freely, particularly on old ore orders carrying prices well below today's level. It is said that invoice prices on current shipments do not average above 2.25c. Iron bars are dull, but prices are well maintained.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Alloy Steel Bars.—The report that prices of these bars recently had been reduced $5 to $10 per ton appears to be a belated chronicling of an old event. Prices reached their present levels about two months ago as shown by IRON AGE quotations and there has since been no change.

Structural Material.—Mills in this territory are holding firmly to 2.50c. for large structural shapes, although new business falls considerably short of making good completed orders. A building permit has been granted the Smithfield Methodist Episcopal Church for a church and office building at Smithfield Street and Seventh Avenue, Pittsburgh. Bids for this building will be asked for in November. Other important structural projects in this district still are dormant. Plain material prices are given on page 788.

Plates.—New business is on a dwindling scale, and it is probable that several of the independent makers soon will have to have additional orders to maintain mill schedules. About 2300 tons of steel, mostly plates, will be wanted for 19 steel barges for the U. S. Engineers, Louisville, Ky., district on which the American Bridge Co. is low bidder. Prices are given on page 788.

Sheets.—General business is somewhat heavier than it was last month, but the market is far from active, this being notably true on black sheets, orders for which are needed by a number of independent mills.

A number of inquiries have been current for tonnages of No. 30 gage black sheets for shipments to Japan, but actual orders are few. Domestic business is somewhat spotty, some consumers having enough tonnage due them on old contracts to meet their probable requirements over the remainder of the year, while others, notably those serving the automotive industry, find it necessary to make fresh purchases. The leading interest is believed to have enough business to run at its present rate of operation, about 80 percent, for the remainder of the year. Independent companies generally are not as well off. Prices show no particular change except that public quotations of less than 3.85c. base for black sheets have pretty well disappeared and a price of 3.75c. base now is developed only by definite offers. Prices are given on page 788.

Tin Plate.—Open market activity is lacking, but consumers are specifying freely on contract and little or no tonnage is becoming available for spot delivery. The price of $5.50 per base box, Pittsburgh, is a fixture.

Bolts, Nuts and Rivets.—Buyers still are working on the old price lists and extras and the changes recently made can hardly become effective before Oct. 1. Bolts still are obtainable at 60 and 10 per cent off list for large machine bolts on the old price lists, and buyers do not appear to be very anxious to contract for rivets at $3 base, plus the new extras. Buyers seem to be looking for further increases in the bolt and nut discounts and for lower base prices on rivets. Prices and discounts are given on page 788.

Cold-Finished Steel Bars and Shafting.—There is a fair run of new orders, which occasionally involve good-sized tonnages, but all makers could handle more business than they are getting. Old orders are melting away pretty rapidly because of the excess of shipments over incoming orders, but as yet the need of business has not become urgent enough to lead to important price concessions. Higher prices are not expected by buyers and they are accordingly keeping purchases closely in line with known requirements. Based on the current price of hot-rolled bars, cold-finished bars should be higher in the preservation of the usual differential; that they are not is probably explained by the fact that little of the tonnage coming in and in process carries either today's quotation, or the extra for cold-finishing quality, having been ordered before the extra became effective. Local mills are quoting 3.25c., base, and disclaim any disposition to meet lower prices reported in the Middle West. Ground shafting still is quoted at 3.65c., base, f.o.b. mill, for carload lots.

Cold-Rolled Strips.—Business could be better with most makers, but a belief that orders will come out quite as well at firm prices as they would at concessions prompts a firm stand at 5c., base, Pittsburgh.

Track Fastenings.—Leading local makers deny having gone as low as 3.15c., base, for small spikes, at which most of the recent business in the anthracite coal mining district is reported to have gone. It is believed here that this price was made by Eastern makers. The local experience is that both large and small spikes are in better demand than they were recently. Prices are given on page 788.

Tubular Goods.—Makers of steel pipe in this district note no let-up in the pressure of buyers for shipments against old orders for standard pipe and also observe that in the face of practically full production of this class of goods, they are unable to keep their customers satisfied. Shipments of lap-welded pipe are still heavy. New business reflects the unsettled conditions of the oil market due to overproduction. Pipe men say that until there is some curtailment of production of oil in California, the outlook for the industry and incidentally the demand for oil country pipe cannot improve much. So many of the California wells are of the gusher type and oil is produced so cheaply there that the temptation to drill new wells will be strong until operators begin to bring in wells which have to be pumped. Shipments on old orders for boiler tubes still are running well in excess of new business. Discounts are given on page 788.

Coke and Coal.—Blast furnace suspensions, with the attendant stopping of coke shipments, are so frequent that coke production cannot be curtailed rapidly enough and the result is that offerings are very heavy and prices have declined further. Today's range on standard furnace grade for prompt shipment was $4.25 to $4.50 per net ton at oven, a decline of 25c. a ton from last week's level, and putting the market back where it was just prior to the advance brought on by the strike of the anthracite coal miners. Fourth quarter contract prices also have eased off about 25c. a ton, the most recent business of this sort having been at $4.75. The market also was weaker on foundry coke, which now is priced at from $5.25 to $5.50 as against $5.75 to $6.50 a week ago. The coal market reflects the fact that there will be no unusual demand for soft coal as a substitute for hard coal and the prospect of lighter industrial demands over the remainder of the year. Mine run steam coal now is quotable at from $1.85 to $2.25 per net ton at mines, gas coal $2.40 to $2.50, and coking grade $2 to $2.50. Slack coal takes a range of from $1.25 to $1.50, and lump coal $2.50 to $3.

Old Material.—Bethlehem Steel Co. was a recent buyer of a round tonnage of heavy melting steel at $18.50, Johnstown. This business is all there is to sustain the recent range on this grade, as there is no interest on the part of local melters in this or any other grade and it is believed that lower prices are immediately ahead, since besides the lack of demand, some of the dealers who took the bullish side of the market recently in expectation of better business, now find themselves "long" of the market and are having much trouble in locating an outlet. There have been no sales of heavy melting grade to the mills at above $18.50 in the past three or four weeks, except one lot of strictly railroad heavy melting steel to one of the Steel Corporation subsidiaries, which brought $19. Dealers a few weeks ago paid $19 or more and now are wondering where to sell their purchases. The market is fairly well sustained on foundry grades, but as a whole is very quiet and gives signs of going lower, especially if some of the dealers long of the market get panicky.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	22.00 to 22.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	16.00 to 16.50
Bundles, sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus bloom and billet ends	24.50 to 25.00
Low phosphorus plate and other material	23.50 to 24.00
Railroad malleable	21.00 to 21.50
Steel car axles	21.50 to 22.00
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	13.00 to 13.50
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	19.00 to 19.50
Stove plate	15.50 to 16.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	18.00 to 18.50

Crane Orders at Chicago

CHICAGO, Sept. 18.—The Milwaukee Electric Crane & Mfg. Co. has booked the following orders: Eight 40-ft., 6-ton electric traveling cranes for the Elgin, Joliet & Eastern Railroad; one 25-ton, 60-ft. span gantry crane for A. Finkl & Sons Co., Chicago; one 10-ton, 5-motor, 89-ft. crane and one 10-ton, 5-motor, 50-ft. crane for Joseph T. Ryerson & Son, Chicago.

A competitive examination for associate mechanical engineer and assistant optical engineer to fill vacancies in the ordnance department at Frankford Arsenal, Philadelphia, have been announced by the United States Civil Service Commission, Washington, to which application should be made prior to Oct. 23.

Chicago

Decided Drop in Southern Pig Iron—New Steel Orders Limited

CHICAGO, Sept. 18.—The market is quiet in all departments and new business in finished steel booked during the week is the smallest taken for a considerable period. Deliveries from local mills are steadily improving and producers east of here are finding it increasingly difficult to obtain orders on the score of better service. Chicago prices, however, are still firm, indicating that mills are not alarmed by the current lull in buying.

Operations in this district have again been slightly reduced, a blast furnace of the Illinois Steel Co. at South Chicago having been blown out for repairs. That company now has 23 active stacks out of 27 steel works furnaces and its ingot production is approximately 90 per cent of capacity. The Inland Steel Co. remains on a 75 to 80 per cent basis.

Pig Iron.—The chief development in the market has been increasing competition from outside furnaces, particularly Southern producers. At least two Southern furnaces have taken business at from $21 to $21.50, base, Birmingham, thereby meeting delivered prices from Northern stacks. One of these producers is said to have withdrawn from the market after booking considerable tonnage. Lake Erie furnaces also continue to be factors at nearby points. An order for 2000 tons of malleable for a plant on the west coast of Michigan was lost to a Lake Erie stack notwithstanding a marked freight advantage in favor of Chicago producers. A Wisconsin melter has closed for 3500 tons of foundry for October delivery, having divided the order between a nearby furnace and a Southern producer. A local user has closed for 800 tons of Northern foundry and another Chicago melter has placed an order for 1000 tons of Southern. A South Bend melter is inquiring for 1000 tons of No. 1 foundry for October shipment. A Wisconsin buyer has closed for 200 tons of foundry for delivery in 30 days. Two 100-ton sales of 7 per cent silvery have been negotiated at the full market. Charcoal and low phosphorus are inactive. On the whole, melters still hesitate to cover their needs for any distance ahead and most purchases are for 30 to 60 days shipment. Northern prices continue steady at $27, base, Chicago furnace, although Wisconsin users are still able to buy from stacks in their own State at $27, base, furnace, instead of f.o.b., Chicago.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00
Malleable, not over 2.25 sil.	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	27.01 to 28.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—Following sales of a considerable tonnage of ferromanganese at $112.50, seaboard, the market has suffered another decline and a number of small orders have been taken at $110, seaboard.

We quote 80 per cent ferromanganese, $117.56 to $118.38, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $50.80, delivered.

Plates.—With demand light and prices unchanged, the market is without features. Shipments from local mills are heavy and producers East of here are finding it increasingly difficult to obtain business in this district on the strength of deliveries. No oil storage tank awards are reported, but two prospective projects in the Southwest involve a total of 2000 tons of plates. Railroad car buying is at a low ebb.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Portsmouth, Ohio, has placed 900 tons with the National Cast Iron Pipe Co. St. Paul has divided 425 tons between the National Cast Iron Pipe Co. and the Glamorgan Pipe & Foundry Co. The American Cast Iron Pipe Co. will furnish 700 tons for Lincoln Park, Mich. Lake County, Ohio, rejected bids on 1200 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—Independent mills in this district have not yet taken any business for Japan, being unable to make the prompt deliveries asked for. They expect to be called upon, however, for tonnage for later shipment. The first effect of the earthquake was the absorption of warehouse stocks in China, the Dutch East Indies, the Philippines and the Pacific Coast. Inquiries for the replacement of these supplies are already making their appearance. The feverish haste with which Japanese importers entered the market following the disaster undoubtedly resulted in considerable duplication of inquiries, and it is therefore difficult to estimate the tonnage which will actually be bought for rehabilitation purposes. In the meantime, domestic inquiry for sheets continues to lag, with black sheets weak and galvanized and blue annealed fairly steady.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—Manufacturing users and jobbers continue to specify liberally to get the benefit of the old list prices. At the same time, a considerable number of fourth quarter contracts are now being closed on the basis of the new lists. Even the farm implement makers, whose operations have been sharply curtailed, are showing interest in their fourth quarter requirements. Discounts remain unchanged and are shown on page 788. In this district the discounts are on a f.o.b. Chicago basis.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The Great Northern has placed 3000 tons of rails with Chicago mills and 2000 tons with the Bethlehem Steel Co. It also ordered 3000 tons of tie plates from the Bethlehem company and 2000 tons from a Chicago producer. The Minneapolis & St. Louis, which, because of its financial situation, had held up shipments of rails, has been ordered by its receiver to specify the remaining 2000 tons still undelivered against its contract. Current inquiries for angle bars aggregate 2000 tons.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—New structural business is in reduced volume, but fabricators are still well booked and are not yet much concerned about getting additional orders. Mills are booking comparatively little new tonnage in plain material.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Pacific Coast stocks of nails have been absorbed by Japanese importers and inquiries for replacements are now current. No estimates of Japanese purchases up to date are available here, but the tonnage bought undoubtedly bulks large. So far as domestic demand for wire products is concerned, there is no scramble to get orders on the books such as obtained earlier in the year. Inquiries are improving,

however, and specifications are fair. Fall demand for barbed wire is commencing to be felt and new business in fencing is in encouraging volume. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 788.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—The aggregate volume of new business is declining, although a considerable number of projects involving more than 100 tons have been let or are active. Competition for tonnage is growing keener and some price concessions are reported, although they are still of an exceptional character. Lettings include:

Buena Vista apartment building, Chicago, 400 tons to Joseph T. Ryerson & Son.

John Marshall High School building, Minneapolis, Minn., 600 tons to Concrete Steel Co.

Gimbel Bros. store addition, Milwaukee, 300 tons to Concrete Steel Co.

Dock for Illinois Central Railroad, New Orleans, 300 tons to Kalman Steel Co.

Kentucky highway work, 200 tons to Corrugated Bar Co.

Illinois highway work, 150 tons to Concrete Steel Co.

Reis Furniture Co. building, South Bend, Ind., 100 tons to Kalman Steel Co.

Lincoln School building, St. Louis, 100 tons to Concrete Steel Co.

Foundations for Milwaukee Journal building, Milwaukee, 100 tons to Corrugated Bar Co.

Alvernia High School building, Chicago, 325 tons to Kalman Steel Co.

School building, Winfield, Iowa, 110 tons to Concrete Steel Co.

Illinois highway work, 100 tons to Kalman Steel Co.

Kelvinator Corporation plant, Detroit, 100 tons to McRae Steel Co.

Pending business includes:

Wharf, Houston, Tex., 2000 tons, general contract awarded to Doullut & Williams, New Orleans.

Chicago, Burlington & Quincy freight house, Chicago, 900 tons, general contract awarded to Blome-Sinek Co., Chicago.

Club house for Olympia Fields Golf Club near Chicago, 200 tons, general contract awarded to Dahl-Stedman Co., Chicago.

Commonwealth Edison Co., Crawford Avenue station, 450 tons, general contract to George A. Fuller Co., Chicago.

State Teachers College building, Winona, Minn., 300 tons.

Warehouse Prices.—Local jobbers have advanced cone head steel boiler rivets $2 a ton to $4.20 per 100 lb.

Bars.—The bar market is quiet, but the price situation is unchanged. Soft steel bars remain firm at 2.50c. Chicago. Hard steel bar makers continue to hold to 2.30c. mill, although two important plants were forced to shut down because of lack of business. Bar iron prices show greater variation, ranging from 2.35c. Chicago, to 2.50c. The ruling market, however, is 2.40c.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Hard cold-rolled strip steel 1/10 in. thick and heavier has been advanced 10 cents per 100 lb. to $7.90 for orders of 2000 lb. and over. Cold-rolled flat wire, 1 in. and wider by 1/10 in. and heavier has been advanced 20c. to $8.25 per 100 lb. for lots of 2000 lb. and over.

Old Material.—The trend of the market is mixed with foundry grades higher and other classes of scrap unchanged or lower. Consumer buying of cast grades has been liberal recently, but the largest individual user has now withdrawn from the market. A rolling mill has placed liberal orders for wrought, but at lower prices. Otherwise the situation has been quiet among both users and dealers. Brokers are no longer buying long in anticipation of rising prices. Railroad lists include the Rock Island, 3800 tons; the Chesapeake & Ohio, 5000 tons, and the Soo line, 500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$21.50 to $22.00
Cast iron car wheels	20.00 to 20.50
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	21.00 to 21.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	20.50 to 21.00
Heavy melting steel	16.25 to 16.75
Frogs, switches and guards cut apart	16.75 to 17.25
Shoveling steel	16.00 to 16.50
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheets	13.00 to 13.50
Axle turnings	13.50 to 14.00
Steel angle bars	18.50 to 19.00
Per Net Ton	
Iron angle and splice bars	22.50 to 23.00
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	25.50 to 26.00
Steel car axles	18.50 to 19.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	10.00 to 10.50
Cut forge	15.00 to 15.50
Pipes and flues	10.50 to 11.00
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.00 to 19.50
Coil springs	20.00 to 20.50
No. 1 machinery cast	20.00 to 20.50
No. 1 railroad cast	19.50 to 20.00
No. 1 agricultural cast	19.50 to 20.00
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	9.00 to 9.50
Cast borings	11.00 to 11.50
Short shoveling turnings	11.00 to 11.50
Stove plate	17.00 to 17.50
Grate bars	15.00 to 16.00
Brake shoes	15.50 to 16.00
Railroad malleable	19.50 to 20.00
Agricultural malleable	17.50 to 18.00

October Meeting of American Iron and Steel Institute

The next meeting of the American Iron and Steel Institute will be held Thursday, Oct. 25, a day earlier than usual, in order to permit members to leave on a midnight train after the banquet to visit the Aberdeen Proving Grounds. A special train of Pullman sleeping cars will leave the Pennsylvania station, New York, at midnight Oct. 25, and will run direct to the Aberdeen Proving Grounds, arriving in time for breakfast. This train will leave the Aberdeen Proving Grounds about 8 p. m., Oct. 26, and will arrive at the Pennsylvania Station, New York, about midnight. Further details as to the trip will be announced later.

Operations of Newton Steel Co.

YOUNGSTOWN, Sept. 18.—Three new sheet mills which are being built by the Newton Steel Co. at its plant in Newton Falls, Trumbull County, will be completed and placed in operation by Oct. 1, states President E. F. Clarke. This will give the company a total complement of 20.

"Business is not so good as last spring," said Mr. Clarke, "but enough tonnage is coming through to enable us to operate all 20 of our mills."

The company is a substantial producer of full finished sheets for the automobile trade.

Directors have declared a common dividend of 60c. and preferred dividend of $1.75 for the third quarter, both payable Oct. 1 to holders of record Sept. 20. The common payment is unchanged from the previous quarter.

The decline in construction volume which began in June continued through August, according to F. W. Dodge Corporation. The August drop from July was 5 per cent.

New York

Southern Iron Sells at Low Prices—Fair Inquiry for Northern Iron

NEW YORK, Sept. 18.—A number of reports in regard to large transactions in Southern pig iron have been current the past few days. One, which seems to be well founded, is that Southern iron has sold at $21.50, the tonnage being between 5000 and 10,000, and it is understood that the company selling the iron has advanced to $24. Another report is that an important cast iron pipe company has purchased a large tonnage. This has not been confirmed. The Southern market seems to be very weak with $23 as the present prevailing quotation. In the New York district the pending inquiries amount to about 12,000 tons, including 5000 tons for the Richardson & Boynton Co., of which 1000 is for delivery this year and the remainder for the first quarter of next year; 2500 tons for the Crane Co., Bridgeport, for delivery the next two months; 700 tons of various grades for the New York Central; 2000 tons for the New York Air Brake Co., for the first quarter of next year and 1000 tons for another company for the remainder of this year. Few sales have been made and the market is still untested, with $25 as the usual basis in eastern Pennsylvania, while $24.50 can probably be shaded at Buffalo.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$28.27
East Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2, sil. 1.75 to 2.25	27.27
Buffalo, sil. 1.75 to 2.25	29.41
No. 2X Virginia, sil. 2.25 to 2.75	31.94
No. 2 Virginia, sil. 1.75 to 2.25	31.44

Ferroalloys.—Because practically all of the present light demand for ferromanganese is being met by what may be termed resale lots of both British and domestic origin, it would not be a surprise if British producers would soon reduce their present price of $117.50, seaboard. The sales referred to have been made anywhere from $110 to $112.50, seaboard or furnace basis, and almost no business is being taken at any higher price. In view of the lessened steel output of the country, demand for spiegeleisen is light at unchanged quotations. There is a moderate demand for 50 per cent ferrosilicon, but the ferrochromium market is dull.

Cast Iron Pipe.—The market is firm with prices unchanged. The period of municipal tenders is coming to an end now and only the smaller tonnages needed to complete work well under way are needed. Makers are well booked ahead. The earthquake in Japan has resulted in a few feelers for pressure pipe of various sizes for use in reconstruction of water supply plants in the devastated area. Prompt delivery, which is now an impossibility, was desired. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. The soil pipe market is enjoying a considerable demand, considering the lateness of the season. Present activity, however, is evidently largely confined to the East. Makers are well booked for the next month or two. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—Practically all warehouse products are quiet and, unless the second half of September proves more active than the first half, the month will probably not measure up to either July or August. Part of the present dullness, it is believed, develops as a result of the much better deliveries now being made by the mills, so that many of the large consumers who were temporarily forced to purchase out of stock are now returning to buying from the mills. Some warehouses look forward to an improvement toward the end of this month. Shading on bars is no longer prevalent and prices generally seem to be holding firm. This is also true of black and galvanized sheets, very little inclination to shade the base of 1.75c. on black and 5.75c. on galvanized being evident. As a result of a change in the differentials on tin plate sizes by the leading interest, warehouses have corrected quotations on charcoal tin plate accordingly. The change involves an average increase in prices from 75c. to 90c. per box. We quote prices on page 804.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The coke market is still showing weakness. Standard furnace coke is quotable at from $4.50 to $5 per ton, with medium sulphur available at about $4.25 per ton and higher. Standard foundry coke ranges from $5.75 to $6.25, with some brands bringing up to $6.50 and $7 per ton. An inquiry is current from the New York Air Brake Co. for 1500 tons of foundry coke, delivered Watertown, N. Y., at the rate of five cars a week until contract is completed. By-product coke is quoted at $11.41, Newark and Jersey City.

Old Material.—On practically all grades the market seems to be holding its own with slight increases on stove plate, specification pipe and heavy melting steel. No. 1 yard steel is fairly firm at $16.50 and $17 per ton, delivered eastern Pennsylvania, with $17.50 reported paid for delivery to Pottsville, Pa. It is believed that some of the present upward movement is a result of dealers covering low-priced contracts. Heavy melting steel, railroad quality, is now quoted at $16.50 delivered eastern Pennsylvania. Stove plate is going forward to Harrisburg consumers and to New Jersey foundries. Shipped to the latter, $18 and $18.50 is being paid for strictly high-grade stove plate, of which dealers and brokers report something of a shortage. Specification pipe is fairly active and is now being bought delivered Lebanon, Pa., at $16.50 per ton, an advance of 50c. Borings and turnings are firm and unchanged. Cast borings and machine shop turnings are being shipped to Harrisburg and machine shop turnings to Phoenixville.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$13.00 to $13.50
Steel rails, short lengths, or equivalent	13.50 to 14.00
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.50 to 15.00
Wrought iron track	13.50 to 14.00
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	11.00 to 12.00
Machine-shop turnings	10.25 to 10.75
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 12.75
Stove plate	15.50 to 16.00
Locomotive grate bars	13.50 to 14.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.50 to 18.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Finished Iron and Steel.—Including an apartment building taking 9000 tons of steel and five New York City school buildings totaling close to 9000 tons the structural steel awards of the past week, as reported to THE IRON AGE, total almost 21,000 tons, nearly all of the work being in the metropolitan district. New projects reported total nearly 17,000 tons. Structural steel work presents by far the most active feature of the steel market, and while the volume of work being let and pending does not approach the peak of last spring, it is showing a gain over recent weeks. Although mills and fabricators are competing more strenuously for business because of the decline of orders on their books, there does not appear to have been much in the way of price concessions on fabricated steel. In some instances, in fact, premiums have been paid by builders for early delivery so that buildings may be housed in before cold weather. In new structural work a considerable part is for buildings in the

rapidly growing garment manufacturing center on Seventh Avenue between Times Square and the Pennsylvania Station. In other steel lines there is scarcely enough business of importance to be recorded. The Standard Oil Co. of New Jersey is in the market for 300 tons of plates and this is today a fairly large inquiry as compared with the carload lots that make up the bulk of current inquiries and orders. This, the third week of September, has brought no indications of fall buying in general steel lines and there is more questioning as to the prospects of sufficient buying to keep mills in operation at anywhere near the present rate during fourth quarter. There has been no change in prices.

Cincinnati

Southern Iron Weak and Prices Lower—Ironton Quotation Declines

CINCINNATI, Sept. 18.—The only inquiry of consequence comes from a Springfield melter for 1200 tons each of malleable and foundry grades for the quarter. This deal, which will probably be closed on Wednesday, is expected to develop lower prices than now prevail, as it is said $24.75, Ironton, has been freely quoted on the inquiry. On a sale of 3000 tons of malleable to Muncie last week, it is said that the delivered price paid was less than $27, the order netting the Lake interest which booked the order around $23.60, or the equivalent of $24, Ironton. The Southern market is weaker at $23, and it is said that an attractive order could be placed at less than this figure. In fact as low as $21.50 is reported to have been quoted, but this price cannot be confirmed. Current orders, which generally are one and two carloads, are taken at $23 base. There is little inquiry or interest being shown in basic or silvery irons. The Wellston furnace blew out on Friday last, leaving three merchant and three steel works furnaces operating in the district.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.77
Basic Northern	26.77
Malleable	26.77

Tool Steel.—Returns for the month of August indicate a great improvement over July in the volume of business. The present month is holding up very well in regard to orders. Prices are unchanged, 18 per cent tungsten high speed steel being quoted at 75c. to 95c. per lb., according to brand.

Sheets.—The demand is getting better, particularly for auto body sheets, and some fair orders have been placed by body makers in the territory at the full price of 5.35c. Black and galvanized sheets are also in a slightly improved demand, some of the larger users having covered for their fourth quarter requirements. Prices generally are unchanged from last week, though less is now heard of concessions on black and galvanized sheets from the price named by the leading interest.

Structural Material.—More activity was evident in the market last week, and some fair-sized lettings were reported. The largest of these was for 19 steel barges for the U. S. Engineers' Office, Louisville, Ky., involving 1900 tons, which went to the American Bridge Co. The Vincennes Bridge Co. is low bidder on bridge work for the State of Indiana, involving approximately 800 tons. Other awards are published elsewhere in this issue.

Reinforcing Bars.—A noticeable pickup in the demand is reported. The largest letting reported is for 300 tons for the Kosair Temple, Louisville, Ky., to the Consolidated Reinforced Steel Co. Road work for the State of Ohio near Dayton will require 420 tons on which bids have been asked. An apartment hotel at Cincinnati will require approximately 800 tons, while an infirmary at Louisville is expected to require about 400 tons. The Breslin office building, Louisville, on which bids will shortly be taken, will include 350 tons of bars, and a school for crippled children at Dayton, Ohio, on which bids are being taken, will require about 100 tons. There is nothing new in the price situation, although it is said that the price of 2.40c. quoted by some mills includes engineering services.

Warehouse Business.—Local jobbers report orders more numerous, but tonnages still light. Improvement, however, is steady, and optimism prevails regarding the situation. Prices have not changed within the past few months, and present conditions do not seem to indicate that any changes will be made in the immediate future.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Finished Materials.—Demand for finished materials continues light. Orders generally are being placed for immediate shipment, and for work in early prospect, there being little inclination on the part of consumers to place orders for stock. There was, however, a slight improvement in the number of orders placed for steel bars, and structural inquiries for work in hand were a little better. Prices show no evidence of changing, and 2.40c. is still regarded as the market on bars, and 2.50c. on shapes and plates. There is some talk of lower prices on hoops and bands, it being stated that at least one mill has gone below 3c. on bands for a small order. Some price cutting in wire products is also reported, but this has not yet reached common wire nails, which are still quoted at $3 per keg, base. Orders for cold-finished materials are in better volume, while on cold-rolled strips it is reported that some consumers in the Detroit district have been able to place orders for very fair tonnages at 4.75c., one order for 1500 tons being reported booked at this figure. There is little activity locally in bolts and nuts, and prices are weak. Track accessories are not in demand, largely on account of the fact that the only large buyer in the territory is not expected to enter the market before next month.

Coke.—There is little activity in furnace or foundry fuels, though domestic sizes are moving fairly well. Prices are inclined to be weaker, but are practically unchanged from last week.

Old Material.—The only activity in the scrap market is trading between dealers. Consumers are buying only small lots. The price situation generally is weaker than last week, and bundled sheet, borings, machinery, cast and tires have been reduced 50c. On the other hand an inquiry for iron axles raised the offered price $1. Other prices are as reported last week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $13.50
Iron rails	16.00 to 16.50
Relaying rails, 50 lb. and up	29.00 to 29.50
Rails for rolling	17.00 to 17.50
Heavy melting steel	15.50 to 16.00
Steel rails for melting	15.50 to 16.00
Car wheels	15.50 to 16.00
Per Net Ton	
No. 1 railroad wrought	13.50 to 14.00
Cast borings	9.50 to 10.00
Steel turnings	9.50 to 10.00
Railroad cast	17.00 to 17.50
No. 1 machinery cast	19.00 to 19.50
Burnt scrap	12.50 to 13.00
Iron axles	23.50 to 24.00
Locomotive tires (smooth inside)	14.00 to 14.50
Pipes and flues	9.50 to 10.00

Good Demand for Detroit Scrap

DETROIT, Sept. 18.—While there has been a slight decrease in melt in this district due to the fact that the automotive industry has reduced production somewhat, there is a very healthy demand for waste material. Radiator plants are running at approximate capacity and stove furnace and other manufacturing on an 80 to 90 per cent basis. Prices are unchanged.

St. Louis

Buying of Pig Iron More Active, Including Two 500-Ton Lots

ST. LOUIS, Sept. 18.—Buying of pig iron during the last week was on a more extensive scale than for several weeks past. The principal sales were of 5000 tons of basic by the St. Louis Coke & Iron Co. to an East Side melter and 5000 tons to a St. Louis melter, a part of the latter sale being Southern iron. A local stove foundry bought 300 tons for prompt shipment and other sales of the local maker amounted to 200 tons for prompt shipment. An Illinois melter has inquired for 500 tons of foundry iron, another inquiry is for 500 tons of malleable and other inquiries before the market amount to about 2000 tons. The melt in the district is increasing. All of the stove foundries are operating, and the job foundries are doing more business. Some melters are well covered on their requirements for some time, while others are content to pursue a hand-to-mouth buying policy because of a lack of confidence in the market. The market for Northern iron is still firm at $27, Chicago, while quotations on Southern make range from $23 to $24, Birmingham. Two sales of 100 tons each of 11 to 12 per cent Bessemer ferrosilicon were made in the district during the week.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	$28.67 to 29.17

Finished Iron and Steel.—Extreme dullness prevails in the market for finished iron and steel. Fabricators have sufficient structural steel on hand to take care of orders already booked, and few big orders are in sight. One concern reports the sale of about 300 tons of structural steel monthly in small lots. The railroads are sending out only a few inquiries for small lots. Manufacturers and jobbers are buying very little.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

O'd Material.—Steel mills in the district bought a few lots of specialties. Outside of this buying was confined to dealers. It is believed that consumers will enter the market about the first of the month. In the meantime, they are only buying occasional "distress" cars—cars that dealers prefer to sacrifice rather than lay down in their yards. Railroad lists continue heavy. New lists include: Baltimore & Ohio, 9000 tons; Rock Island, 2000 tons; Wabash, 3500 tons and Missouri-Kansas-Texas, 1600 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Rails for rolling	17.50 to 18.00
Steel rails less than 3 ft	19.50 to 20.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
Per Net Ton	
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	16.00 to 16.50
Iron car axles	25.00 to 26.00
Steel car axles	18.50 to 19.00
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.25 to 19.75
Cast iron borings	12.00 to 12.50
No. 1 busheling	15.75 to 16.25
No. 1 railroad cast	19.50 to 20.00
No. 1 machinery cast	20.00 to 20.50
Railroad malleable	17.50 to 18.00
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

Coke.—A much better demand for coke from foundries in the district is reported, although sales are still confined to small lots, not more than their requirements for 30 to 60 days. Sales of Connellsville 72-hr. coke were made at prices ranging from $6.50 to $7.50, an advance of 50c. from the bottom price. Cooler weather has caused a better demand for domestic coke.

Buffalo

Improvement in Pig Iron Inquiry, But Prices Do Not Show Strength

BUFFALO, Sept. 18.—Marked improvement in inquiry for pig iron has developed and considerable tonnage has been placed. New business is mainly for fourth quarter delivery and there is a dearth of spot shipment tonnage. There is no question that $25 base price has been shaded on several transactions where the tonnage was greater than 1000, but $25 remains firm for the ordinary run of business. One furnace quoting $25 on 1500 tons for Eastern delivery lost the business in competition. Action on another inquiry for 1500 tons of furnace iron was postponed after prices were received. Foundry activity is brisk and stock piles are exceedingly low. Several 2000-ton lots are being inquired for in this district. About 12,000 tons has been sold and as a general proposition most of it went at less than $25. There is no further curtailment in furnace operation.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.00 to $25.50
No. 2 foundry, 2.25 to 2.75 sil.	24.50 to 25.00
No. 2 plain, 1.75 to 2.25 sil.	24.50 to 25.00
Basic	26.00
Malleable	25.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—New business in semi-finished material has not brightened in proportion to expectations with the close of the vacation period. In bars, shapes and plate, demand is not very urgent and reports are current that shape prices have been shaded in several instances, and that tonnages have been closed on the price of 2.40c. Plate demand in this territory comes mainly from car builders and at this time they are seemingly not interested in the market. Pipe demand is especially brisk and another inquiry for 2500 tons of line pipe has been put up by a Canadian company, interested in shipping the material to South America. Bar and plate prices hold, as do sheet prices. Demand for fourth quarter tin plate is brisk.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Coke.—Demand for furnace coke is weaker, but foundry grades are still sought in big measure. Prices on foundry coke range from $6 to $6.50.

Old Material.—The fact that most consumers are in urgent need of heavy melting steel and indications are that some buying will be done this week; dealers are not anxious to sell at less than $19. One mill is understood to have paid better than $19.25 for heavy melting steel in a direct purchase from a railroad. There is more confidence all around, but it has not reached the stage that business has been placed.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Birmingham

Pig Iron Selling Not Equal to Production—Prices Uncertain

BIRMINGHAM, ALA., Sept. 18.—Pig iron selling in the Birmingham district is not equal to the make, though numerous orders are being booked, and as a consequence there is a little uneasiness that the present pace of production cannot be continued. By the end of the month, if not before, conclusion will have been arrived at as to the curtailment of make, by blowing out two or more blast furnaces. Some of the melters are asking for concessions, and the price situation is unsettled. Southern territory demands have been in small lots for spot delivery. The situation is summed up as follows: the Sloss-Sheffield Steel & Iron Co. with five blast furnaces in operation is still piling some iron; the Republic Iron & Steel Co. with two furnaces making iron is not selling make; the Alabama Co. with two furnaces in blast is moving its iron steadily and also taking some iron from its surplus stocks; the Woodward Iron Co. has three furnaces in blast and piling some iron; the Tennessee Coal, Iron & Railroad Co. has seven furnaces on basic and three on foundry, needs all the basic being produced and is out of the open market on foundry; the Central Coal & Iron Co. has sold the probable make of its single furnace for the remainder of the year. The Gulf States Steel Co. is moving off its basic iron on yards while the blast furnace is undergoing repairs and will not be ready to resume operations for a month. The Shelby Iron Co. is repairing the charcoal furnace at Shelby and will not put it back in commission until November. In the meantime stock is being moved off the yards. Local melters are buying as immediate needs are met with, confidence being held that when iron is needed it can be gotten and at the lowest price. Pressure pipe, radiator and stove makers are operating to capacity.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$22.00 to $23.00
Basic	24.00
Charcoal, warm blast	$33.00 to 34.00

Cast Iron Pipe.—Every week the pressure pipe plants of the Birmingham district are receiving more or less lettings. The American Cast Iron Pipe Co. announces 495 tons taken from San Francisco the past week and 159 from Glendale, Cal. The United States Cast Iron Pipe & Foundry Co. and the National Cast Iron Pipe Co. also participated in the lettings of the past week. The two last named companies are pushing the work on additions of DeLavaud machines for the manufacture of pressure pipe.

Coal and Coke.—Coal production in Alabama shows a little improvement, though not as much as was anticipated. The coke demand is lagging and unless there is an early recuperation in the market, curtailment will be necessary. Four of the by-product coke oven plants of the district by reason of gas contracts with municipal and other consumers will have to continue in steady operation whether there is any coke demand or not. Coke prices are around $8 as maximum, foundry coke.

Boston

Less Activity Among Foundries Reflected in Pig Iron Sales

BOSTON, Sept. 18.—Less activity among New England jobbing foundries, which constitute a large percentage of the melters in this territory, is reflected in pig iron sales. Foundries maintained by industries generally are operating almost full, but they are well covered on pig iron requirements for the next two months or longer. Sales reported the past week in very nearly all cases concerned car lots, and in the aggregate were the smallest noted in several weeks. Eastern Pennsylvania iron, which previous to the ending of the anthracite labor troubles advanced to $25.50 furnace base, with regular differentials, is now offered at $25 for No. 2 plain, No. 2X and No. IX. It is intimated that less than $25 base could be done on desirable business, but the lack of such tonnages fails to substantiate this report. Buffalo No. 2 plain, No. 2X and No. 1X are obtainable at $25, with few takers, and buyers still maintain central and western Pennsylvania furnaces will accept less even on car lots. Not enough is being done in Virginia and Alabama iron to really establish a market and quotations therefore are largely nominal.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$28.65
East. Penn., sil. 1.75 to 2.25	28.65
Buffalo, sil. 2.25 to 2.75	29.91
Buffalo, sil. 1.75 to 2.25	29.91
Virginia, sil. 2.25 to 2.75	32.42
Virginia, sil. 1.75 to 2.25	31.92
Alabama, sil. 2.25 to 2.75	33.60
Alabama, sil. 1.75 to 2.25	33.10

Coke.—According to local by-product foundry coke producers, the settlement of the coal strike has failed to check the demand for such fuel. Specifications against contracts are running fully as strong as a week ago, and new business is increasing. Both the New England Coal & Coke Co. and the Providence Gas Co., however, have speeded up shipments. They continue to quote on a basis of $13.50 delivered in New England. Prompt shipment Connellsville foundry coke is offered more freely, usually at or about $6 on cars or $11.55 delivered, but aside from those in Connecticut, foundries show little interest.

Old Material.—The recent celebration of the Jewish New Year put a decided quietus on the old material market, from which it has not recovered. Sentiment among the trade, however, is optimistic, it being commonly predicted mill buying will increase this month. Dealers are still endeavoring to accumulate material, yet holders are less inclined to sell at going prices. One house, by marking up its bid of $12.50 to $13 for chemical borings, secured 250 tons for New England consumption, but for points outside $12.50 appears the limit buyers will pay. New York inquiries for round tonnages of horse shoes at $17 to $17.25 on cars shipping point have disclosed a shortage. A Norwood, Mass., brake shoe manufacturer continues to offer $17.50 delivered for stove plate, but is reported as securing only occasional truckloads. No. 1 textile machinery cast also is not coming out, but a moderate amount of No. 1 machinery sold the past week to nearby consumers at $22.50 delivered. The Watertown Arsenal, Watertown, Mass., has disposed of additional scrap tonnages.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.00 to 17.00
Railroad malleable	21.00 to 21.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	13.50 to 14.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

The properties of the American Coke Corporation which is in receivers' hands will be sold at public auction on Thursday, Sept. 27, at the Fayette County Courthouse, Uniontown, Pa. The properties listed for sale are the Orient Plant, American No. 1 and No. 2 Plants, and Struthers Plant, together with mine supplies at these plants. Receivers are George S. Baton, Frank W. Byrne and R. H. Jamison.

The Technical Photographic and Microscopical Society will hold its fall meeting at the Grand Central Palace, New York, in conjunction with the 1923 Chemical Exposition. The meeting will be held Sept. 21.

Cleveland

Low Price for Sheet Bars—Lull in Pig Iron Market

CLEVELAND, Sept. 18.—While ore shipments are fairly heavy, they will show some falling off this month. The movement for the first half of September was at the rate of about 9,000,000 tons for the month. One large Eastern consumer has just made a 10 per cent reduction in its shipping schedule for the season. With an ample supply of cars, shippers are about a month ahead on some of their shipping orders. Present indications are that the movement after November will be light and that there will be an early closing of the ore shipping season.

Pig Iron.—The market has again become very quiet. The decline in activity was unexpected, as a week ago there were indications of an increased volume of business. Several foundries that inquired for first quarter iron have decided to postpone purchases and other buying is light, being limited for the most part to small lots for immediate requirements. One producer during the week sold from 5000 to 6000 tons, all in small lots. Little inquiry is pending. Some attribute the recent spurt to an expectation by consumers that if the anthracite coal strike had not been settled promptly, pig iron prices might have advanced. A Muncie, Ind., melter who recently inquired for 2000 tons of malleable iron, has placed this business but it did not go to a Cleveland producer. The Westinghouse Electric & Mfg. Co. has not yet purchased the 6600 tons of foundry iron wanted for its Cleveland and Trafford City plants, but is expected to place the former lot in a day or two. An inquiry for 1500 tons of foundry iron from a Bucyrus consumer is still pending and it is understood that a Valley producer has quoted $24.50 on this inquiry and that the same quotation has come from the Valley district on two or three inquiries, although a Valley producer continues to make sales at $25. The Cleveland market is firm for local delivery, producers holding to $25.50 at furnace for foundry and malleable grades. Low phosphorus iron is weak and is no longer quoted above $30 by a Valley producer. Southern iron shows signs of weakness and while no actual quotations are reported in this territory, producers have indicated to consumers that they will take business at $23 for Alabama iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	26.00
Southern fdy., sil. 1.75 to 2.25	28.00
Malleable	26.00
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00

Bolts, Nuts and Rivets.—Local bolt and nut manufacturers are holding to 60 and 5 per cent off list for large machine bolts and for small carriage bolts, rolled thread, and to other prices on their regular schedule, although at least one small manufacturer is quoting an additional 5 per cent discount. Some fourth quarter business is being taken at higher prices. Rivets are firm. While the common quotation is 3c. for large structural rivets, concessions to 2.90c. are being made. One local manufacturer has revised prices of small rivets to 65 and 10 per cent off list.

Semi-Finished Steel.—The market has softened, in spite of the efforts of some mills to keep prices at $42.50. One consumer has been able to buy a round lot of sheet bars at $40, Youngstown, for the fourth quarter, and another has purchased several thousand tons of slabs at considerably under $42.50, but above $40, Youngstown. A local mill made a few small lot sales during the week at the regular price. On forging billets the price of $47.50 has been shaded on a 50-ton order.

Sheets.—The volume of sheet business is light. Most consumers are carrying fair stocks or have material coming on contract. Very little business is being booked for the fourth quarter, as consumers seem disposed to buy in small lots as needed. On black sheets 3.75c. is being quoted by several mills, but other grades are firm at regular prices.

Reinforcing Bars.—The market on rail steel bars is weak. While the common quotations range from 2.20c. to 2.30c., the lower price is being shaded. There is a fair demand for small lots for specific work, but jobbers are not buying for stock. Orders include one for 300 tons for a viaduct in Akron, Ohio.

Finished Iron and Steel.—New demand for steel is light. Mills are getting a fair volume of orders, but they are nearly all for small miscellaneous lots for early requirements and shipments generally are in excess of bookings. Prices on steel bars, plates and structural material are firm and there seems to be little effort on the part of buyers to secure concessions. Plates are moving fairly well in small lots, the demand for them being better than for steel bars and structural shapes. Small mills are quoting plates at 2.50c., Pittsburgh, for prompt shipment and Eastern mills continue to get some orders at the same price at mill. Light plates are quoted at 3c. for No. 10 gage. Reports from Detroit indicate that some of the leading automobile companies that have brought out new models as well as parts manufacturers who supply them with parts are increasing production schedules, but some of the smaller automobile manufacturers are curtailing production. Most automobile manufacturers are buying steel only in small lots for early needs. In the building field considerable new work is in prospect, but inquiry is light. Bids for the bank and office building for the Brotherhood of Locomotive Engineers of Cleveland, requiring 5000 tons, which is the only project of any size out for figures, will be taken Oct. 15. The inquiry for 2400 tons of steel for bridge work for the Great Northern Railroad, on which an Ohio fabricator has been figuring, has been withdrawn. Prices on bands are not firm. On these 3c. instead of 3.15c. has become a more common quotation.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—Prices on standard Connellsville foundry coke have declined sharply and quotations range now from $5.50 to $7. These prices are being named both for prompt shipment and contract. The market is inactive.

Old Material.—The market for the first time in weeks shows a downward tendency. Apparently the only reason the dealers had for forcing prices upward was the release of a number of shipping orders by the mills and the expectations of some new demand. However, little buying developed during the advancing prices and, without a buying movement to support the market, the softening of prices was not surprising. Heavy melting steel has declined $1 a ton and turnings are slightly lower. Quotations on most other grades are unchanged, but these in the absence of transactions are largely nominal. A Cleveland consumer, during the week, purchased 8000 to 10,000 tons of heavy melting steel at $18 to $18.50 and about 8000 tons of compressed steel at $16 to $16.50, but these sales were made before the weakness developed.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.50 to $17.00
Rails for rolling	20.00 to 20.50
Rails under 3-ft	19.50 to 20.00
Low phosphorus melting	20.00 to 20.50
Cast borings	13.50 to 14.00
Machine shop turnings	12.50 to 13.00
Mixed borings and short turnings	12.50 to 13.00
Compressed sheet steel	15.50 to 16.00
Railroad wrought	16.00 to 16.50
Railroad malleable	23.00 to 23.50
Light bundle sheet stampings	12.00 to 12.50
Steel axle turnings	16.00 to 16.75
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.00 to 13.25
Drop forge flashings	13.25 to 13.75
Railroad grate bars	17.00 to 17.50
Stove plate	16.00 to 17.00
Pipes and flues	13.50 to 14.00

Philadelphia

No Signs as Yet of Resumption of Steel and Pig Iron Buying

PHILADELPHIA, Sept. 18.—Expectations of a fall revival in steel and pig iron buying of sufficient volume to give mills and furnaces substantial backlogs for fourth quarter have been toned down to a considerable degree and the trade begins to view the outlook for the remainder of the year with less optimism. The situation is particularly acute for Eastern plate mills, which with possibly one exception are down to 50 per cent operation and new business is not coming to them in the volume necessary to maintain that rate for very long. Some of the plate mills have fairly good orders on their books for the Pennsylvania Railroad at Altoona, but these were held up some weeks ago because of congestion of material at that road's car shops and there has not been enough tonnage from other sources to take their place.

Price weakness in plates has not actually developed, but this appears to be due mostly to lack of opportunity to quote on desirable tonnage, as there are indications that some mills would go to 2.40c., Pittsburgh, if such a reduction would produce any business. For the first time since prices reached their present level, there seems to be concern among steel mill representatives as to their ability to hold prices on plates and shapes for the rest of the year. A further concession of $1 a ton on structural shapes is reported to have been made by one Eastern mill, bringing its price down to 2.35c., Pittsburgh, on such business as it finds desirable, this being $3 a ton under the quotations of other producers.

A large independent steel company, in making a canvass of its trade in this territory, found that about half of the large buyers are fully covered on their steel requirements for the remainder of the year, taking into account steel on hand and yet to be shipped on old orders, while the other half of the principal consumers report they will need some steel to finish out the year, but say that they are not yet ready to buy. With manufacturing consumers virtually out of the market and with little specific tonnage coming up, apart from structural steel, the mills begin to take a less hopeful view of the next few months than was in evidence a few weeks ago. Yet there are some people who still look for a fair amount of fall buying next month.

In pig iron there is no change in conditions and the scrap market likewise reflects the general lack of buying interest. Pig iron shows some further signs of softening, but, as in steel, there is little inquiry of importance in the market.

Pig Iron.—The pig iron market is again in that state of questioning as to the future that develops when production and stocks are in excess of the tonnage being sought by consumers. Buying of iron, which is confined mostly to foundry grades, is so light that in the past week some companies have booked orders equal only to about one day's output. The orders are small, ranging from a carload to 100 tons, and on these quantities there is less disposition on the part of sellers to shade prices. Most of the current orders are being taken at $25, furnace, for No. 2 plain and at $25.50 for No. 2X, but that sellers are willing to go lower on attractive business is indicated by orders placed a week ago by a Trenton, N. J., melter for 2500 tons. Three furnaces participated in this business at $24.50, furnace, for No. 2 plain and at $25, furnace, for No. 2X. The minimum freight rate was $1.13 per ton, making a delivered price of $26.13 on No. 2X. Furnace representatives say that their present minimum on No. 2X is $25.50, furnace, but it will require further inquiry of importance to develop the strength or weakness of this price. The only business in basic was a sale of 2000 tons to a New England consumer at $24, furnace. Copper free low phosphorus iron is now offered by a New York State furnace at $28, furnace, with a freight rate to Philadelphia of $4.79, and close to 1500 tons was sold last week at this level. Copper-bearing iron is quoted by eastern Pennsylvania furnaces at $28, furnace. The Robesonia furnace, out for repairs, will be relighted Oct. 7. Although the importation of foreign pig iron was thought to have ceased, 4200 tons came in last week at this port from England.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.76 to $26.63
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to 27.13
East. Pa. No. 1X	26.76 to 27.63
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 30.67
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.17
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ore.—Last week's receipts of iron ore were 19,900 tons from Cuba and 6814 tons from Sweden; 1500 tons of chrome ore was received from British India.

Ferroalloys.—The Bethlehem Steel Co., which for some time has made ferromanganese only for its own use, has become a merchant seller and is offering it at $112.50, furnace. Some resale ferromanganese is to be had at slightly under this price. British producers have not changed their prices, still quoting $117.50, seaboard, but naturally are taking no business at this figure.

Semi-Finished Steel.—Open hearth rerolling billets are quoted at $42.50 and forging billets at $47.50, Pittsburgh, but in view of the declining orders for finished steel, there is some likelihood that lower prices might be quoted if attractive inquiry were presented. No such inquiry is at hand, however.

Bars.—One large maker of steel bars reports that its total tonnage for last week was about double that of the week previous, but this really means little in relation to the company's capacity. Most of the orders are for one or two carloads and for immediate specification. Aside from a few contracts with jobbers there has been very little fourth quarter contracting. Consumers generally seem to be well supplied, and are still getting shipments on old orders. Bar iron is quoted at from 2.35c. to 2.40c., Pittsburgh. The larger makers of shafting and screw stock still quote 3.25c., Pittsburgh, but slight concessions have been offered by smaller producers.

Warehouse Business.—Orders received by local warehouses are in fair volume, though less than they were getting a month or so ago. Prices for local delivery are unchanged as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅞ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Sheets and Tin Plate.—Inquiries for sheets from Japan have come to this market, these calling mostly for No. 30 and No. 30½ gages. Sheet mills are fairly well supplied with orders and see a continuation of good business to the end of the year, and the same holds true of tin plate—a situation quite different from that existing in the heavier products. Prices are unchanged.

Coke.—A decided easing in the coke supply has brought lower prices on furnace coke, now available at $4.50 to $4.75, Connellsville.

Old Material.—The failure of steel mills to show a gain in new bookings of finished steel has been reflected in the scrap trade, as obviously there will be no gain in buying of steel melting scrap unless the mills maintain a good rate of operation. As the Eastern scrap trade depends to a considerable extent on the consumption by plate mills, and as plate business has declined more than any other, the scrap trade takes a less hopeful view than a few weeks ago, when a revival of steel buying had been expected to develop this month. Heavy melting steel presents a variation in prices. The largest consumer is offering only $16.50, while sales have been made within the week to other consumers at $17. Dealers who recently took orders at a Pottsville mill at $17.50 have not fully covered on these orders, so that this latter price also remains as a market factor. Other grades of scrap show more strength than melting steel. Sales of No. 1 railroad wrought by the Pennsylvania Railroad brought out fairly good offers. Sales to consumers have been negotiated at $20 to $21, delivered. The Bethlehem Steel Co. has reduced its price on blast furnace borings and turnings to $10, delivered, which is $2.50 or $3 a ton below the prices at which dealers would be willing to sell. The explanation of the scrap trade is that the Bethlehem company is well provided with turnings and that its reduction is equivalent to a withdrawal from the market.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.50
Scrap rails	16.50 to 17.00
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast-iron car wheels	21.00 to 22.00
No. 1 railroad wrought	20.00 to 21.00
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	18.00 to 20.00
No. 1 cast	21.50 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.50 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Plates.—A declining volume of new steel tonnage invariably affects Eastern plate mills among the first, and the present is no exception. While in other steel products many mills still have fairly good specifications yet to be filled, the plate mills of this district are on the ragged edge. One mill has sufficient specifications to run practically full until the end of this month, but its production is small. Other mills have from one to three or four weeks' work ahead at a reduced rate of operations. With the exception of the one mentioned, all of the Eastern plate mills are now operating at about 50 per cent, and it is agreed that this rate will not be maintained for long unless there is an increase in business. Up to this time there has been no sign of any willingness to break away from the 2.50c. price, but some mills would not hesitate to go to 2.40c., Pittsburgh, though it is recognized that such a concession would not bring out the desired tonnage. The Southern Pacific Railroad is asking bids on a boat that will require 3500 tons of plates and shapes, and one or two shipbuilders have inquired for steel prices.

Structural Material.—It has been surprising to some buyers of structural shapes that the quotations of 2.40c., Pittsburgh, by an Eastern mill have not up to date affected the determination of other mills to adhere to 2.50c. on plain material. Buyers have made the effort to place shapes with other mills at 2.40c. but apparently without success. It is now reported that 2.35c., Pittsburgh, has been quoted by this Eastern mill on certain tonnage. Whether this difference of $3 a ton between the lowest quotation and the figure named by all other producers will eventually have its effect on the price situation is yet to be developed.

San Francisco

Pig Iron Very Dull and Conditions in General Are Quiet

SAN FRANCISCO, Sept. 6.—A noticeable undercurrent of quiet pervades the iron and steel markets in this city, and in a general way nearly all the Pacific Coast seems to be similarly affected. While it is true that some mills and foundries are still busy finishing up the remnants of early placed orders, it is equally true that others are gradually slowing down because the booking of new business is materially diminished as compared with the corresponding period of last year. Some of the leading importers and jobbers are not backward in saying that business is dull, while others are disinclined to appear pessimistic while speaking of the trade outlook in connection with the admitted quiet of the present. Several foundries report a fair volume of business in the line of small castings and some of the mills say the demand for steel for reinforcement purposes still maintains a good volume of activity with prices steady. Reports are current, however, that fractional shading of figures has occasionally occurred. Complaints about lack of new orders is now more general than at any time since the trade quietness was first noticed several weeks ago. Trade sentiment is inclined toward the belief that the depression, while conforming to conditions prevailing in the leading Eastern markets, is intensified on this coast by high labor costs, coupled with new demands in several trades for still further wage advances.

Pig Iron.—Both importers and jobbers report the market very dull, with inquiries confined to small lots, and the outlook for the near future not very favorable for an increased demand. Prices, too, are showing some weakness with the prospect of further reductions. Current rates are now $33 to $35 per ton ex-ship, and one dealer is said to have offered to shade the minimum figure without effecting a sale. Total imports by sea during August were only 726 tons, and while the receipts by rail are not known, it is believed the total is less than twice the tonnage received by sea. There is a little more activity in Los Angeles than in this city for the present, and sales there during the past ten days are reported as in excess of 3200 tons, with the probability of another sale within a day or two of another 1000 or possibly 1500 tons. The demand for future delivery is practically at a standstill, both mills and foundries having sufficient supplies on hand to meet requirements for the present, and, in fact, for the next two months, unless there should be a very material increase in new business.

Old Material.—Sales of the last two weeks have been unusually light, and although prices are not quotably different from the figures of two weeks ago, the indications are for a decline in the near future. Some of the mills are decidedly backward about paying the maximum figure, and it is considered doubtful whether an offering at slightly shaded figures would be regarded as any inducement to buy. The mills are reported as well supplied for at least a couple of months, and the foundries are nearly as well provided for. That prices will be lower seems to be generally recognized as almost a certainty.

The Fabricated Production Department of the Chamber of Commerce of the United States has issued a pamphlet relating to the acceptance and installation of uniform methods of cost accounting by members of a trade association. It is the purpose of the pamphlet to aid officers and members of trade associations which have undertaken to obtain advantages of uniform methods of cost accounting.

British Iron and Steel Market

Strong Japanese Demand for Thin Galvanized Sheets—Finished Steel Firmer—Continental Markets Irregular

(By Cable)

LONDON, ENGLAND, Sept. 18.

There is an improved general demand for pig iron but there have been few important sales yet recorded. Consumers apparently are more inclined to purchase and forward inquiries are spreading over the end of the year.

Foreign ore is quiet. Best Bilbao Rubio is quoted nominally at 22½s. to 22¾s. ($5.11 to $5.17) ex-ship Tees.

Finished steel has a firmer tendency on high costs. Demand is improving, though it is still disappointing except on specialties for the Far East. Workington has secured 18,000 tons of rails and accessories for the Gold Coast.

August exports of pig iron, excluding ferroalloys, amount to 55,107 tons. The total of iron and steel exports was 323,877 tons.

Continental markets are irregular owing to the well-sold condition of most Belgian works. Japan has bought fair quantities of angles, sections, bars, wire and wire nails.

Billets are being sold at £7 ($31.78) delivered to North East Coast and £6 12s. ($29.96) f.o.b. is also quoted.

In Belgium the threat of liquidation of the Ruhr stocks is causing anxiety. Forty-one furnaces out of 56 were blowing Sept. 1.

Tin plate minimum remains unchanged. Large sales made to many parts have resulted in works being sold out until the second half of October, while the demand is mainly for early October, though some inquiries extend to the end of the year. The Tin Plate Bar Association price remains unaltered.

There is strong demand from Japan for thin galvanized sheets. The works are well sold out at advancing prices. Japanese specifications 6 x 3, 60's, are being sold at £28 (5.675c. per lb.) f.o.b.

Far Eastern demand for black sheets is maintained. The works are sold out until February-March. Sales of 6 x 3, 13's, 107 lb., are being made up to £20 10s. (4.15c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.54 per £1, as follows:

Durham coke, delivered	£2	1s.	to	£2	1½s.	$9.31	to	$9.42
Bilbao Rubio ore†	1	4				5.45		
Cleveland No. 1 foundry	5	2½				23.27		
Cleveland No. 3 foundry	4	17				22.02		
Cleveland No. 4 foundry	4	12				20.88		
Cleveland No. 4 forge	4	10				20.43		
Cleveland basic	5	0				22.70		
East Coast mixed	4	18½	to	5	0	22.36	to	22.70
Ferromanganese	18	0				81.72		
Ferromanganese*	18	10				83.99		
Rails, 60 lb. and up	8	0	to	9	0	36.32	to	40.86
Billets	7	10	to	8	5	34.05	to	37.46
Sheet and tin plate bars, Welsh	9	2½				41.43		
Tin plates, base box	1	3⅛	to	1	3¼	5.25	to	5.28
						C. per Lb.		
Ship plates	9	5	to	9	15	1.87	to	1.98
Boiler plates	12	10	to	13	0	2.53	to	2.63
Tees	9	15	to	10	5	1.98	to	2.08
Channels	9	0	to	9	10	1.82	to	1.93
Beams	8	15	to	9	5	1.77	to	1.87
Round bars, ¾ to 3 in.	10	15	to	11	5	2.18	to	2.28
Galvanized sheets, 24 g.	18	10	to	18	15	3.75	to	3.80
Black sheets, 24 gage	13	15				2.79		
Black sheets, Japanese specifications	15	5				3.09		
Steel hoops	12	0	&	12	10*	2.43	&	2.53*
Cold rolled steel strip, 20 gage	17	5				3.50		
Cotton ties, Indian specifications	15	0				3.04		

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:									
Belgium	£5	2½s.	to	£5	5s.	$23.27	to	$23.84
France	5	2½	to	5	5	23.27	to	23.84
Luxemburg	5	2½	to	5	5	23.27	to	23.84
Billets:									
Belgium	6	12½	to	7	0	30.08	to	31.78
France	6	12½	to	7	0	30.08	to	31.78
Merchant bars:						C. per Lb.			
Belgium	7	15	to	8	0	1.57	to	1.62
Luxemburg	7	15	to	8	0	1.57	to	1.62
France	7	10				1.52		
Joists (beams):									
Belgium	7	12½				1.55		
Luxemburg	7	12½				1.55		
France	7	10	to	7	12½	1.52	to	1.55
Angles:									
Belgium	8	0	to	8	5	1.62	to	1.67
⅛-in. plates:									
Belgium	8	5				1.67			
Germany	8	10				1.72			
¼-in. plates:									
Luxemburg	7	15				1.57			
Belgium	7	10				1.52			

Pig Iron and Finished Materials in Poor Demand—Sheets for Japan Active

LONDON, ENGLAND, Sept. 6.—Though the holidays are over, there is yet no sign of improvement in demand for iron and steel. The pig iron trade especially is in a poor state and, though makers endeavor to meet the position by continually reducing prices, consumers on the whole are still holding off. No. 3 Cleveland has fallen to 97½s., but, even at this comparatively low price buyers are not keen, and stocks are still being accumulated at makers' works. In the hematite trade the damping down of furnaces has prevented prices running away, and East Coast mixed numbers are fairly steady at from 98½s. to £5. In the Northeastern district, since the end of June, eight furnaces have been put out of blast, leaving 12 running on hematite, and making the total Cleveland furnaces producing all grades of pig iron no more than 40.

Demand for finished iron and steel is generally poor, purchasers considering prices too high and looking for considerably lower figures, but makers on the other hand assert that, even at today's figures there is little or no margin of profit owing to the continued high costs of production. In certain specialties, such as contracts for railroad material both at home and abroad, and in sheets for construction purposes, there is a good deal of trade passing, but the shipbuilding trade, which is the backbone of the steel industry, is almost dead. There were no new contracts placed on the Clyde last month, and the total launchings were only nine small vessels.

Japanese Situation

It is early yet to predict what benefit, if any, British iron and steel manufacturers will obtain from the disaster in Japan, but at the present time, at any rate, there is a run on thin steel sheets, both plain and galvanized, for temporary dwellings and warehouses, and many thousands of tons have been booked, some for shipment as far ahead as March. Of course, for a long time there is bound to be a strong demand from that quarter, and it is thought likely that, when other main overseas markets, such as India, realize this, they, too, will come in and place their requirements.

The Continental position seems rather obscure. Practically the only material offering is Belgian and Luxemburg, and even these deliveries are ahead, works having booked pretty considerable orders. These, however, have not been passing through hands in this country, and it is assumed have been done by Continental shippers direct. The fact is that probably plants are working at very low capacity owing to fuel shortage, and so have easily filled their books.

Among recent railroad contracts placed was one by the Great Indian Peninsular Railway for 77 motor and trailer coaches for the electrification of the Bombay lines, which has been awarded to Cammell, Laird & Co.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base .....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb.....3.15c.
Bands, base, per lb.....3.15c.
Strips, base, per lb.....3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.62

Cold-Finished Steels

Bars and shafting base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb..... 2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire, No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Woven fence, carloads (to jobbers)....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 to 60, 10 and 5 per cent off list
Machine bolts, small, cut threads,
60 and 10 to 60 and 5 per cent off list
Machine bolts, larger and longer,
60 and 10 to 60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60 and 10 to 60 and 5 per cent off list
Cut threads.....60 to 50, 10 and 5 per cent off list
Larger and longer.....60 to 50, 10 and 5 per cent off list
Lag bolts .....65 and 10 to 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 5 per cent off list
Larger and longer sizes.....50 and 5 per cent off list
Hot pressed square or hex. nuts, blank.....4.00c. off list
Hot pressed nuts, tapped.....4.00c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 per cent off list
1 in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.$2.90 to $3.00
Small rivets .....65, 10 and 5 to 65 and 5 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb..... $3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb.....$3.15 to 3.50
Spikes, ⅝ in..... 3.15 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.50
Track bolts, ¾ in. and larger, base, per 100 lb..$4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜ ....+11		+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12 ...	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜ ...	47	30½	¼ to ⅜ .....+19		+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½....	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10.....	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1¼ in. .....+18	
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....+ 8	
3 in.	40	2 to 2¼ in.....— 2	
3¼ to 3¾ in.....	42½	2½ to 3 in.....— 7	
4 to 13 in.....	46	3¼ to 4½ in.....— 9	

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3¼ and 3¾ in.....	37
1¾ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		
Hot Rolled			
3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base .....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage..	15
2¼-in. O.D. 12 gage..	17	5⅝-in. O.D. 9 gage..	55
2¼ in. O.D. 11 gage..	18	5½-in. O.D. 9 gage..	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base $11.00		20-lb. coating I. C....$14.90	
		25-lb. coating I. C....	16.20
8-lb. coating I. C....	11.30	30-lb. coating I. C....	17.35
12-lb. coating I. C....	12.70	35-lb. coating I. C....	18.35
15-lb. coating I. C....	13.95	40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.225	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.27
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.34
Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	43c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	41c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00 to $112.50
Ferromanganese, British, 80 per cent, f.o.b Atlantic port, duty paid	110.00 to 112.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

	High Duty	Moderate Duty
Fire Clay:		
Pennsylvania	$46.00 to $48.00	$40.00 to $45.00
Maryland	50.00	45.00
Ohio	45.00 to 46.00	40.00 to 42.00
Kentucky	45.00 to 46.00	40.00 to 42.00
Illinois	48.00	45.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton		6.50 to 9.50
Silica Brick:		
Pennsylvania		42.00 to 45.00
Chicago		52.00
Birmingham		53.00
Ground silica clay, per net ton		10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	$40.00 to 42.50
Sheet bars, open-hearth	40.00 to 42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅜-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Week's Orders and Inquiries Half Again Greater Than August Averages

With some 29,000 tons of fabricated steel orders and over 19,000 tons of fresh inquiries, the past week's showing is as good as that of the two preceding combined. Awards were swelled by public school work in New York and loft building projects in New York account for most of the new pending jobs. Some railroad bridge work figured. Awards include:

Two school buildings, New York, totaling 2600 tons, to Easton Structural Steel Co.

School building, New York, 1500 tons, to Hinkle Iron Construction Co.

School building, New York, 1500 tons, to A. E. Norton, Inc.

Apartment building on Seventy-first Street, New York, 450 tons, to A. E. Norton, Inc.

Parochial school building, Fourth Avenue and Forty-third Street, Brooklyn, 325 tons, to George A. Just Co.

Garage on Jerome Avenue, New York, 300 tons, to George A. Just Co.

Apartment building at Madison Avenue and Fifty-eighth Street, New York, 1300 tons, to Paterson Bridge Co.

Apartment building at 277 Park Avenue, New York, Thompson-Starrett Co., general contractor, 9000 tons, to American Bridge Co.

Elks' building, Long Island City, N. Y., 450 tons, to American Bridge Co.

Glens Falls Portland Cement Co., Glens Falls, N. Y., plant addition, 200 tons, to Bethlehem Construction Co.

Girls' Commercial High School, Brooklyn, N. Y., 3000 tons, George A. Fuller Co., general contractor; steel awarded to New York Shipbuilding Corporation.

Cherry Street bridge over Fox River, Appleton, Wis., 768 tons, sublet by Wausau Iron Works to American Bridge Co.

Ford Motor Co., hydro-electric station, St. Paul, Minn., 246 tons, to Pittsburgh Bridge & Iron Works.

Goss Printing Press Co., building, Chicago, 552 tons, to Continental Bridge Co.

Capitol Theater Building, Chicago, 393 tons, to Duffin Iron Works.

Great Northern Railway, bridges near Minot and Des Lacs, N. D., 920 tons, to Milwaukee Bridge Co.

State of Minnesota, bridges, 326 tons, divided between Illinois Steel Bridge Co. and Minneapolis Steel & Machinery Co.

Certainteed Products Co., cement plaster mill, near Grand Rapids, Mich., 478 tons, to Mississippi Valley Structural Steel Co.

U. S. Gypsum Co., plant at Sweetwater, Tex., 218 tons, to Kansas City Structural Steel Co.

State of Indiana, highway bridges, approximately 800 tons, Vincennes Bridge Co., low bidder.

Fiber Conduit Co., Richmond, Ind., 300 tons, to Hetherington & Berner.

State of Indiana, reformatory at Pendelton, 200 tons, to Hetherington & Berner.

Kosair Temple, Louisville, Ky., 450 tons, to Louisville Bridge & Iron Co.

U. S. Engineers' Office, Louisville, Ky., 19 steel barges, approximately 1900 tons, to American Bridge Co.

Meredith Building, Huntington, W. Va., 250 tons, to Cincinnati fabricator.

Rowland Building, Columbus, Ohio, 250 tons, to Columbus Structural Steel Co.

School on Long Island, 250 tons, to Kellogg Structural Steel Co.

High school, Ambridge, Pa., 500 tons, to American Bridge Co.

Duquesne Light Co., Pittsburgh, substation, 175 tons, to Jones & Laughlin Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Two loft buildings on Thirty-seventh Street, New York, for the Bricken Realty Co., totaling 2000 tons.

Loft building on Seventh Avenue, New York, in new garment manufacturing zone, 6000 tons.

Crystal loft building, in new garment manufacturing zone, New York, 1000 tons.

Greenberg loft building, Seventh Avenue and Thirty-seventh Street, New York, 2000 tons.

President James Monroe High School, Bronx, New York, 3000 tons.

School building No. 108, New York, 1500 tons.

Bridge over Raritan River, Perth Amboy, N. J., Frederick Snare Corporation low bidder. Low bid was $1,000,000 above engineers' cost estimates, hence letting of contract is in doubt.

New York Central Railroad, bridges, 400 tons.

Chesapeake & Ohio Railroad, bridges, 500 tons.

George W. Smith & Co., Philadelphia, addition to woodworking plant, 400 tons.

Union Trust & Savings Bank Building, Davenport, Iowa, 750 tons; bids closed Monday, Sept. 17.

American Sintering Co., plant, Hubbard, Ohio, 600 tons, general contract awarded to H. K. Ferguson Co., Cleveland.

Union Pacific, girder spans, 179 tons.

Illinois Central, two 40-ft. deck plate girder spans and Springfield Avenue subway, Champaign, Ill., 100 tons.

Knights of Columbus club building, Madison Street near Cicero Avenue, Chicago, 600 tons.

Quick Meal Stove Co., St. Louis, factory, 150 tons.

RAILROAD EQUIPMENT BUYING

Minimum Amount of Repair Work Pending in Both Cars and Locomotives

According to the car service division of the American Railway Association, fewer freight cars were in need of repair on Sept. 1 than on any date since November, 1920. The total was 175,327 or 7.7 per cent of the number on line. The number of locomotives in need of heavy repair on Sept. 1 was 9392 or 14.7 per cent, the smallest number since Aug. 1, 1920.

Of the new freight cars on order on Sept. 1, box cars numbered 31,807, coal cars 29,203, refrigerator cars, 6989 and stock cars 3079.

According to the Department of Commerce, unfilled orders for locomotives at the end of August called for 1497, of which 91 were for foreign buyers.

The main items of the week are:

The Elgin, Joliet & Eastern has placed 500 steel underframes with James G. Heggie & Sons.

The Universal Portland Cement Co. is inquiring for 50 hopper cars of 70-tons capacity.

The Minnesota Steel Co. has placed 44 hopper cars with the Pressed Steel Car Co.

The New York, Chicago & St. Louis is inquiring for 200 underframes for box cars and 10 underframes for caboose cars.

The Engineers & Contractors' Supply Co., Milwaukee, is in the market for one 6-ton 24-in. gage steel ore car.

The Chicago & North Western Railroad has ordered 8 locomotives from the American Locomotive Co.

To Sue Bethlehem Shipbuilding Corporation

WASHINGTON, Sept. 18.—The United States Shipping Board has instructed its legal department to prepare suit against the Bethlehem Shipbuilding Corporation for $2,500,000 alleged to have been overpaid on that company's war contracts. The matter has been under negotiation for some time, but no settlement has been reached. If the position of the Shipping Board in this suit is maintained it may open up a long series of litigation involving many other war contracts.

The question at issue is whether the Bethlehem Shipbuilding Corporation is entitled to profits made under a so-called "economic clause," by which it was to share with the Government in savings effected in the building of ships. The Shipping Board now contends that this clause carries no weight and that the contractor was morally bound to conduct the work as economically as possible. The Department of Justice has concurred in this view.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
12.....	14.12½	13.50	42.25	7.00	6.75	6.90	6.55
13.....	14.00	13.50	41.50	7.12½	6.80	6.90	6.55
14.....	14.00	13.50	41.00	7.12½	6.80	6.85	6.50
15.....	14.00	13.50	....	7.12½	6.80	6.85	6.50
17.....	14.00	13.37½	41.00	7.12½	6.80	6.82½	6.47½
18.....	14.00	13.37½	41.50	7.12½	6.80	6.80	6.45

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Sept. 18.

The markets are all exceedingly quiet with lower prices in most of them. Demand for copper has fallen off and quotations are ½c. lower than a week ago. The heavy buying of tin has ceased and quotations have considerably declined. Lead is the only market which has advanced. Buying of zinc is extremely light and prices have fallen about 10 points in the week.

Copper.—The optimism prevalent a week ago in the electrolytic copper market has been displaced by a considerably easier tone. The slowness in the settlement of the Ruhr problem is one factor as well as a decline in the London market. Domestic consumers in the face of easier conditions here are slow to enter the market and demand from that source is exceedingly light. There has also been a falling off in export sales. As a consequence of these conditions prices have declined until today electrolytic copper is available in quantity from several sources at 13.62½c., delivered, or 13.37½c., refinery. Lake copper is quoted at 14c., delivered.

Tin.—Only a fair business in Straits tin has been recorded in the past week. On Thursday and Friday, Sept. 13 and 14, about 300 tons changed hands on each day, with most of the buying done by consumers. Yesterday was an exceedingly quiet day and business today was also light. The latter part of last week the London market declined despite fairly good transactions on this side with the result that further buying here was halted. The London decline referred to is attributed to large selling of tin in the Far East, which was very heavy last week. This was supposed to consist of some of the Government stocks known to exist there. The fact that yesterday and today sales from that quarter were small tends to confirm the foregoing assumption. Today there was a sharp advance of nearly £4 per ton in London prices, with spot standard quoted at £197 5s., future standard at £197 15s. and spot Straits at £201 5s., all, however, about £1 per ton less than a week ago. The quotation today was 41.50c., New York, for spot Straits. Arrivals thus far this month have been 2090 tons, with 5505 tons reported afloat.

Lead.—On Thursday, Sept. 13, the leading interest advanced its quotation 10 points to 6.85c., New York, the outside market having already been at least 15 points higher than that for some days. The independent market has continued to advance with good sales at St. Louis on a basis of 6.80c., and with sales for delivery in the East at 7.12½c., New York. Apparently the leading interest is not a free seller at its new quotation.

Zinc.—Domestic buying is still light and unsatisfactory and the market is quiet and considerably easier. There has also been a sharp decline in export sales. Prime Western for early delivery is quoted at 6.45c., St. Louis, or 6.80c., New York.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for both shot and ingot nickel are 29c. to 32c.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 7.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26.50c., New York, duty paid, in such cases where they can obtain it from foreign producers. No quotations are made public by the leading domestic producer.

Old Metals.—Business is quiet and the market is sluggish. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.25
Lead, heavy	6.25
Lead, tea	5.25
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

SEPT. 18.—In a listless market tin and zinc have declined. The old metals are unchanged except for a decline in copper wire, shapes and clips. We quote in carload lots, Lake copper, 14.50c.; tin, 42.50c.; lead, 6.80c.; spelter, 6.50c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4.25c.; pewter, No. 1, 21c.; tin foil, 26c.; block tin, 32c.; all buying prices for less than carload lots.

Crystalline Structure of Ferrite

Ferrite is the metallographic constituent, iron, which forms the basis of all steels. Hence, any advance in our knowledge of its characteristics is of interest and also of some possible technical importance. The crystal grains of ferrite often show a peculiar network within the individual grains after various types of etching for revealing the microstructure. This gives the material the appearance of being of a very fine grained structure which, if true, would greatly affect the properties of the material.

During the past month the Bureau of Standards has devoted some time to the study of the phenomenon which has been noted by other observers, although no explanation of its nature has ever been suggested. The work has not yet been completed, but the results so far obtained indicate that this peculiar feature in the structure of ferrite is not related to the ordinary crystalline structure as it exists at room temperatures. When ferrite is heated sufficiently, it undergoes an allotropic change. Some evidence has been obtained indicating that when the iron is cooled from a high temperature all evidence of the structural condition existing at that temperature is not entirely erased, but persists as a pattern superimposed upon the ordinary structural arrangement. When the iron is reheated to a sufficiently high temperature although considerably below the temperature at which the allotropic change takes place, the characteristic network previously mentioned results, but upon continued heating this is wiped out as equilibrium is obtained. Further work is in progress to show more clearly in what these changes consist, but it is evident from what has already been accomplished, that they are quite different from the usual processes of recrystallization and grain growth.

As one indicator of the industrial trend, figures may be taken of the sales of mechanical stokers, the statistics of which are collected by the Department of Commerce. In August sales were made for a rated capacity of 71,693 hp. for the 15 establishments making the reports. This compares with 52,518 hp. in July. The monthly average for the first quarter was 72,950, that for the second quarter, 81,850 hp. and the eight months average this year is 73,580 hp.

PERSONAL

J. W. Troupe, formerly superintendent open-hearth department, Upson works, Bourne-Fuller Co., Cleveland, now is a member of the sales force of the McFeely Brick Co., First National Bank Building, Pittsburgh.

R. T. Harris, formerly superintendent No. 1 open-hearth department, Lackawanna Steel Co., Buffalo, has joined the Vulcan Furnace & Equipment Co., Westinghouse Building, Pittsburgh, as efficiency man in the installation of the Loftus improved open-hearth furnace.

William W. Peacock, for the past nine years attached to the Pittsburgh office of the Motch & Merryweather Machinery Co., Cleveland, has severed that connection to become associated with J. L. McCartney in the Pittsburgh office of the Niles-Bement-Pond Co.

Thomas Scott, formerly assistant superintendent of the open-hearth department, Brier Hill Steel Co., Youngstown, Ohio, has been appointed superintendent of the open-hearth department of the Toronto, Ohio, plant of Follansbee Bros. Co., Pittsburgh, succeeding Winsor Evans, resigned.

George Haglund, metallurgical engineer Ljusne Iron & Steel Works, Sweden, who recently spent several days inspecting Worcester, Mass., plants, will shortly sail from New York for his home.

Judge E. S. Hall has been elected president of the Chase Turbine Mfg. Co., Orange, Mass., to succeed George E. Dexter, who served as president and treasurer. Albert M. Dexter is treasurer and general manager.

H. H. Meehan of Milwaukee, who went to Yokohama, Japan, some time ago to supervise the construction of three large hydroelectric generating plants for the Allis-Chalmers Mfg. Co., Milwaukee, reported, in a cablegram to the home office, that he and his family are safe. John A. Roberts, representative of the Allis-Chalmers company at Tokio, has also reported that he and his family are alive and well.

Bert L. Hendershot, district sales manager National Cast Iron Pipe Co., at Dallas, Tex., has been appointed Pacific Coast sales manager in charge of a newly opened office at Los Angeles, Cal.

E. J. Lowry, metallurgist, Hickman, Williams & Co., will address the Detroit Foundrymen's Association at Detroit, Sept. 20, on the "Blast Furnace in Relation to the Foundry."

M. S. Palmer has been appointed representative in the New England district of the brass goods companies of Manning, Maxwell & Moore, Inc. His headquarters are at 5 Watson Street, Boston.

Edward C. Smith has been appointed manager of pig iron sales, effective Sept. 24, by the Belfont Iron Works Co., Ironton, Ohio. He has been connected with the iron and steel business for the past 25 years. His first experience was with the Dayton Coal & Iron Co., with which he was connected from 1899 to 1903, when he became sales agent at St. Louis of the Sloss-Sheffield Steel & Iron Co. In 1912 he resigned to become manager of sales and purchases of the Howe Scale Co., San Francisco. He returned to the East in 1918 and joined the sales force of the Matthew Addy Co., with headquarters in Cincinnati, with which company he has been connected since. He will make his headquarters at Ironton.

N. B. Norris has been appointed manager of the New Orleans office, 938 Whitney-Central Building, of the Pawling & Harnischfeger Co., Milwaukee.

John R. Poyser, for 12 years secretary in charge of sales for the Canton Foundry & Machine Co., is now sales manager of Doelger & Kirsten, Milwaukee.

C. D. Hollins, formerly sales manager of the Black Products Co., has been appointed manager of the sales department for the National Engineering Co., holding the title of second vice-president.

Walter A. Deems, for the past 10 years master mechanic of the Baltimore & Ohio Railroad Co.'s New York terminals and the Staten Island Rapid Transit Co., Tompkinsville, S. I., has resigned to join the machine tool sales organization of Manning, Maxwell & Moore, Inc., New York.

E. C. Morse, previously in the Boston and Washington offices of the Westinghouse Electric & Mfg. Co., has joined the Triumph Electric & Ice Machine Co. as vice-president in charge of sales.

E. D. Spicer has resigned as works manager of the Kerr Turbine Co., Wellsville, N. Y., to become general manager of the Standard Turbine Corporation, Wellsville. H. R. Geiger has been appointed New York manager of the latter company.

Marcus A. Follansbee, formerly of the Follansbee Brothers Co., Pittsburgh, has been appointed vice-president of C. S. Davis & Co., Inc., Chicago, to have charge of the newly established sheet steel, tin and terne plate department.

James F. Lyon, representative of the Brown & Sharpe Mfg. Co., now has offices in Los Angeles, Cal.

Harold P. Childs, formerly special representative of the executive offices of the General Electric Co., New York, has become associated with the Heine Boiler Co. as manager of the New York office.

M. W. Moss, representative of the American Rolling Mill Co., Middletown, Ohio, in Japan and his wife, are among the survivors of the Japanese earthquake. A cablegram to the company from Mr. Moss stated that he was then at Nikko, 40 miles from Tokio.

OBITUARY

GENERAL CHARLES L. FITZHUGH, for a period of 30 years active in the steel industry in Pittsburgh as president of Shoenberger & Co., later the Shoenberger Steel Co., died at his summer home in Coburg, Ontario, Sept. 16. Before becoming identified with the steel industry, General Fitzhugh had been in the United States Army, having been a graduate of West Point. He won an enviable record in the Civil War, out of which he came with the rank of brevet brigadier general. He retired from the Army a few years after the conclusion of the Civil War and became associated with Shoenberger & Co. in 1869. This connection he retained until the company was absorbed in 1899 by the American Steel & Wire Co. He was a native of New York and in his eighty-sixth year. In recent years he had made his home in Washington. He is survived by Mrs. Fitzhugh, who was the daughter of George Shoenberger and a granddaughter of Peter Shoenberger, founder of Shoenberger & Co.; also by two sons, Henry and Carroll Fitzhugh.

JAMES A. BECKETT, assistant engineer American Malleable Castings Association and acting field representative for that organization, died on Aug. 22. He was born in the North of Ireland in 1855 and came to this country at an early age, securing employment as molder with the W. A. Wood Mowing & Reaping Machine Co., Hoosick Falls, N. Y. He was made foreman in 1895 and later was appointed general manager of the plant, from which position he resigned in 1910. During the World War, he resumed active duties as production engineer with the Rochester, N. Y., division of the ordnance department. Afterwards he became associated with the American Malleable Castings Association. Mr. Beckett was a member of the American Society for Testing Materials.

WILLIAM J. HASKINS, aged 50 years, tool steel salesman of the Midvale Co., was killed in an automobile accident near Troy, Ohio, Sept. 17, while making a trip from Springfield to Troy. Mr. Haskins' connection

with the steel business covers 35 years, all of which were spent with the Midvale Steel & Ordnance Co. and the Midvale Co. He began in the machine shop as apprentice and worked up to superintendent. About 10 years ago, he took the position of demonstrator and salesman of tool steel for the company and worked out of the Cincinnati office. Upon the purchase by the Bethlehem Steel Corporation of the Midvale Steel & Ordnance Co., he went with the Midvale Co., and since that time has been working from the Cleveland office with local headquarters in Dayton. Mr. Haskins was a native of Philadelphia, to which city his body was sent for interment.

DANIEL BEST, founder of the Best Mfg. Co., San Leandro, Cal., died recently at his home in that city, aged 85 years. He crossed the plains to Oregon in 1859 and settled in San Leandro in 1886, commencing the manufacture of combined harvesters and heavy threshing machines. About 12 years ago the company name was changed to the Best Tractor Co., and since has specialized in the manufacture of motor-driven caterpillar tractors for farm service, an invention of L. C. Best, son of the founder, and now head of the organization.

JULIUS E. ROTTHAUS, who was assistant to the president of the Thomas Iron Co. prior to the absorption of that company by the Reading Iron Co., died Sunday, Sept. 9, at Whitehaven, Pa., at the age of 39. Shortly after the sale of the Thomas Iron Co., Mr. Rotthaus formed a partnership with W. A. Barrows, Jr., who was president of the Thomas Iron Co., the firm being known as Barrows & Rotthaus. Offices were opened in the Widener Building, Philadelphia, for the sale of pig iron, coal, coke, etc., but soon after Mr. Rotthaus contracted the illness which resulted in his death.

GUSTAVUS L. STEUBNER, aged 69, president of two Long Island City iron foundries, died on Sept. 12 at his home, 14 Botanic Place, Flushing, L. I. He was a native of Reading, Pa., but went to Long Island City at an early age and formed the partnership, Steubner & Woods, iron founders. This firm was succeeded by the G. L. Steubner Iron Works of which Mr. Steubner was head. He was also president of the Long Island City Foundries Co.

CARL A. SCHNEIDER, production manager Cincinnati Screw Co., Loveland, Ohio, died at Mercy Hospital, Hamilton, Ohio, after an illness of three weeks. He was born in Hamilton and was 42 years old.

LANGDON GIBSON, noted explorer, who until two years ago was production manager of the General Electric Co.'s Schenectady works, died Sept. 5, at Criehaven, Me., where he was spending the summer. Death was due to cerebral hemorrhage. He was a native of Boston and was 58 years of age. Mr. Gibson had been associated with the company 31 years.

ORAMEL M. CURRIE, for 30 years superintendent of the Stewart Boiler Works, Worcester, Mass., died at his home in that city on Sept. 10, aged 53 years.

GEORGE MACLAGAN, president and treasurer Garvin Machine Co., New York, died of apoplexy at his home in Mountain Lakes, N. J., on Sept. 15. He was born in 1858 and prior to his association with the Garvin company in November, 1901, had been connected with a chemical firm. Mr. Maclagan was a member of the Machinery Club. He is survived by three daughters.

CYRUS REIMER, sales manager of the American Hoe & Fork Co., Cleveland, died Sept. 14, age 69 years.

Active work of standardization by the American Marine Standards Committee is reported by the Department of Commerce to be imminent. The committee is to look into details of both hulls and engines of ships, as well as care and operation of various types of equipment, including the ship as a whole.

Sales of Sheets in August Show Moderate Gain Over July—Shipments Also Large

PITTSBURGH, Sept. 18.—Sales of sheets in August by independent manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers showed a moderate gain over those for July, but there was an even greater increase in shipment last month. Again in August as in July the excess of shipments over new orders was a matter of more than 100,000 tons. Unfilled orders on Aug. 31 were 316,972 tons, a decrease of approximately 88,000 tons in a month. Net obligations arrived at by deducting unshipped and unsold stocks were 182,366, against 263,738 tons on July 31.

August figures in net tons compare with those for July and June as follows:

	August	July	June
Capacity (tons)	420,000	385,000	392,000
Per cent reporting	69.5	69.6	70
Sales (tons)	116,659	92,358	172,637
Production (tons)	234,112	174,910	218,432
Shipments (tons)	234,486	192,261	233,128
Unfilled tonnage	316,972	404,868	503,175
Unshipped stocks (tons)	102,354	109,068	115,649
Unsold stocks (tons)	32,252	32,062	29,827

COMING MEETINGS

September

Machine Tool Exhibition. Sept. 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven Branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

West Virginia and Kentucky Association of Mining, Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 25, fall meeting in New York; Oct. 26, visit to Aberdeen Proving Ground, Md. E. A. S. Clarke, 40 Rector Street, New York, secretary.

American Gear Manufacturers Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

Thermal Treatment of Molded Pieces

(*Continued from page* 743)

material. As this porosity appears to be connected with the heating, it is compelled to manifest itself, whatever the thermal treatment chosen.

Moreover, all shells treated were in their cast condition. After all investigations which have been made on the sonorousness of semi-steel shells, during the war, this is an indication of very poor mechanical qualities. Moreover the intensity of the sound is connected with the modulus of elasticity, and the latter, for castings, decreases with the elastic limit. These results of hydraulic tests and of sonorousness have been the reason for discarding thermal treatment of semi-steel, together with the fact that these treatments are delicate and very troublesome to carry out.

STEEL AND INDUSTRIAL STOCKS

Early Strength Turns Into Downward Reaction Despite Favorable World News

After ready response to news of Franco-German accord, steel and industrial stocks sustained an abrupt downward reaction. Under the early stimulus of favorable world conditions, Steel common and Republic displayed certain strength. Cast Iron Pipe issues made new highs on the movement. Independent steels gathered strength and have done better than the Steel Corporation in recent weeks. Reversals set in at midweek, when selling was general and most issues grew heavy. Steel again dipped below 90.

The range in active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	41	44½	Int. Har.	75	78¼
Allis-Chalm. pf..	92	93	Int. Har. pf....	107½	109
Am. B. S. & Fdy.	69½	71	Lima Loco.	62½	67⅜
Am. Can	91	99⅞	Midvale Steel ..	26	28⅝
Am. Can pf.....	108	108⅞	Nat.-Acme	10¾	10¾
Am. Car & Fdy.	157¼	166½	Nat. En. & Stm..	58	63⅝
Am. Car & F. pf.	118¼	118¼	N. Y. Air Brake	33½	36⅜
Am. Loco.	69	75⅛	Nova Scotia Stl.	16	16
Am. Loco. pf....	114½	117½	Otis Steel	8⅛	9¼
Am. Radiator ..	81⅞	82	Otis Steel pf....	50	50
Am. Steel Fdries.	35⅛	37⅛	Pressed Steel Car	54	56½
Am. Steel Fd. pf.	98¼	99½	Pressed Steel pf.	89	89
Bald. Loco.	115¾	125½	Ry. Steel Spring.	103	107
Bald. Loco. pf..	113	113	Replogle Steel ..	11½	13¼
Beth. Steel	48½	54½	Republic	43¼	50½
Beth. cum. pf...	94	94¾	Republic pf. ...	88½	94
Beth. Stl., 8% pf.	105	105	Sloss	45	49
Br. Em. Stl., 1 pf.	59⅞	59⅞	Steel of Canada.	67½	69
Br. Em. Stl., 2 pf.	16½	18	Superior Steel ..	28	28
Chic. Pneu. Tool.	79⅞	85	Un. Alloy Steel..	31	32½
Colo. Fuel	26½	30½	U. S. Pipe.....	29¼	32½
Crucible Steel ..	60	67¾	U. S. Pipe pf...	75	79
Crucible Stl. pf..	89	89	U. S. Steel.....	87⅞	93⅝
Deere pf.	62	62	U. S. Steel pf...	116⅞	117½
Gen. Electric ...	172	176	Vanadium Steel.	28¾	34¼
Gt. No. Ore Cert.	29	30	Va. I., C. & Coke	80	80
Gulf States Steel	76½	88⅝	W'house Air Br.	81	81⅛
Inland Steel ...	34	34	Y'gstown S. & T.	69¾	69¾

Industrial Finances

William J. Breen, William J. Breen & Co., 148 State Street, Boston, pig iron and coke, and New England representative of the Sloss Sheffield interests, has filed a petition in bankruptcy showing liabilities of $223,747.17, and assets of $34,352.89. Of the liabilities, $136,899 is unsecured to about 70 creditors. Secured claims amount to $14,729. The petitioner also is liable as indorser of $45,000 notes, accommodating the Palmer Foundry & Machine Co., Palmer, Mass., which recently filed a petition in bankruptcy. The assets consist chiefly of debts due on open accounts.

New Steel Casting Company to Succeed Penn Seaboard

President Warren, Penn Seaboard Steel Corporation, in a letter addressed to holders of the 7 per cent serial notes maturing Feb. 1, 1924, says in part: "A new corporation will be formed under the laws of Pennsylvania or such other State as counsel may advise, to be known as 'Penn Steel Castings Co.' or having such other name as may be approved by the directors, having an authorized capital of $500,000 par value of 8 per cent cumulative preferred and 10,000 shares of common without par value. The new company also will authorize the issuance of $1,100,000 first mortgage 7 per cent sinking fund 15-year gold notes. Subject to obtaining the approval of the stockholders, the new company will purchase from the corporation the steel casting plant at Chester, Pa., with approximately $500,000 net quick assets, and in payment the new company will issue to the corporation all its stock, both preferred and common, and all bonds herein before referred to.

"Subject to the deposit of sufficient 7 per cent serial gold notes and to the consummation of the plan, the corporation submits the following proposition:

"On or before Dec. 1, 1923, the corporation, in exchange for each 7 per cent serial gold note series B of principal amount of $900, will pay the holder thereof $200 in cash on account of principal, with accrued interest to date from which interest accrues on bonds of the new company, and in addition will deliver to holders of each of said notes $700 principal of bonds of the new company."

The International Chain & Mfg. Co., 1207 Vine Street, Philadelphia, has moved to larger quarters at 1015-1019 Chestnut Street. The company's York, Pa., and Philadelphia plants are in operation.

To hold and operate the mines in Mexico purchased by the American Smelting & Refining Co. from Compania Metalurgica Mexicana, Towne Mines, Inc., has been formed with F. H. Brownell as president and W. E. Merriss as secretary. Both are officers of the American Smelting Company. Capital stock consists of 40,000 shares of preferred stock, $100 par, and 40,000 shares of common stock no par value. These mines, particularly those at Somberete, have been important producers in the past and have considerable potential value.

NEW TRADE PUBLICATIONS

Electric Resistance Materials.—Henry Wiggin & Co., Ltd., Birmingham, England, (Branford Electric Co., 39 Cortlandt Street, New York). A 48-page catalog descriptive of various trade marked resistance wires, including nickel-chromium alloys of varying compositions, as well as nickel-steel, copper and nickel, nickel-silver, nickel with a small percentage of manganese, etc. The catalog is informative in that it contains a large amount of tabular matter covering not only these specific products, but also the electric and heat resistance tables of various materials, tables of square and circular mils, gage tables, etc.

Lathes.—Cisco Machine Tool Co., Cincinnati. 20-page loose-leaf catalog illustrating and describing engine and rapid production lathes, including those driven by geared heads. Special parts are shown in detail, including quick change gear boxes, attachments of various sorts, a square carriage turret with four holes, a taper attachment and a full swing rest being among the features. Metric lathe gear boxes are also shown. Specifications are given, as well as details of construction of the various types of lathes described.

Pulverized Fuel Systems.—Combustion Engineering Corporation, Broad Street, New York. A 12-page pamphlet dealing with Sopulco fuel equipment, with a number of illustrations, both photographic and diagrammatic, and giving evaporative tests of boilers equipped with this apparatus. General advantages include ability to burn practically any fuel, decreased labor cost, increased capacity, ease of ash removal and of operation, etc.

Electric Power Transmission.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Catalog covering line material and porcelain insulators, supplementary to its large supply catalog. It is a 200-page publication of convenient size, fully illustrated.

Truck Springs.—Saving Spring Co., Ashland, Mass. A very attractive 12-page pamphlet describing the plant where these springs are made and touching particularly upon the personal element in both shop and office. The plant is thoroughly modern and has equipment designed for the specific purpose of turning out its definite product.

Machinery Markets and News of the Works

WESTERN ELECTRIC BUYS

Large Orders for Special Equipment for Kearny, N. J., Plant Total $1,000,000

Some Railroad Orders Still Being Placed, But Machine-Tool Business Generally Is Dull

The Western Electric Co. announces the purchase of special machinery and equipment for its cable and telephone switchboard plant, now being built at Kearny, N. J., involving a total expenditure of $1,000,000, with $250,000 additional for power plant equipment.

Railroad buying has tapered off but some orders are being placed. The Southern Pacific has bought an axle lathe, a large engine lathe and a 6-ft. radial drill, and the Central of Vermont has bought a large engine lathe and a 5-ft. radial drill. The New York Central has bought a large engine lathe. The Nickel Plate has ordered several tools. The American Locomotive Co. has taken a large planer and some other tools. There has been other miscellaneous buying by railroads and equipment companies, but none of importance. The Pennsylvania Railroad, Central Region, has taken no action on a list of 34 tools issued some time ago, but the Pittsburgh trade is expecting that orders will come soon.

According to reports of machine-tool salesmen, many manufacturing plants are very busy, but mostly on old orders, and buying by these companies is at low ebb. It will require a resumption of general business activity to bring them again into the market for new shop equipment.

Although the General Electric Co. has ceased buying tools for its present plants, it will soon issue a list of equipment required for its new switchboard plant in Philadelphia, for which building contracts were recently let. Another prospective list is for equipment needed by the Department of Plants and Structures, New York, for a motor bus repair station, but this may not come out for some time.

The Petroleum Iron Works, Sharon, Pa., has bought several plate fabricating machines for a new shop at Beaumont, Tex. The Cleveland Stone Co., Cleveland, is inquiring for eight machines. Six hand-screw machines were bought by the Remy Electric Co., Cleveland.

Some fairly good business from automobile companies is pending. A Detroit automobile manufacturer last week ordered about a dozen machines.

New York

NEW YORK, Sept. 18.

LARGE purchases of special machinery and other equipment have been made by the Western Electric Co. for its new cable and telephone switchboard plant now being erected at Kearney, N. J., but dullness still prevails in the machine-tool trade. The purchases of the Western Electric Co., according to an official announcement by this company, have totaled $1,000,000. Negotiations for these machines have been under way for some weeks.

Machine-tool salesmen who have visited manufacturing works throughout the Eastern territory within the past week or two have found many plants working at capacity, but they are working on old orders with little new business in sight and consequently are not interested in buying more shop equipment until the future trend becomes more clearly indicated. Industrial companies have almost entirely dropped out of the market as buyers of tools. For example, the General Electric Co., Schenectady, N. Y., which has been a consistent buyer of tools since the first of the year, is now making few, if any, purchases for its existing plants, but will soon issue a fairly large list of machines which will be required for its new switchboard plant in Philadelphia, now in course of construction. Another list expected to come into the market soon will cover the machine-tool equipment needed for the motor repair station of the Department of Plants and Structures, city of New York, the building now being under construction. Tool purchases of importance in the past week have been almost entirely by railroads or companies doing railroad work.

The American Locomotive Co. has bought a large planer and other tools. The Southern Pacific Railroad has ordered an axle lathe, an engine lathe, 36 in. x 18 ft., and a 6-ft. radial drill for its shops at Bayshore, Cal., the Central Railroad of Vermont has bought an engine lathe, 36 in. x 17 ft., and a 5-ft. radial drill, and the New York Central has bought an engine lathe, 36 in. x 14 ft. The Ingersoll-Rand Co. of New York has bought a 48-in. x 26-ft. crank shaft lathe and the Ferracute Machine Co., Bridgeton, N. J., has bought a 6-ft. horizontal boring and drilling machine.

The Forsberg Electric Mfg. Co., 100 West Houston Street, New York, has inquiries out for a milling machine.

The United States Navy Purchasing Office, South and Whitehall Streets, New York, will take bids at once for 8748 ft. of steel tubing, N. S. A. F. requisition 84.

The International Lead Co., a subsidiary of the Anaconda Copper Mining Co., 25 Broadway, New York, is completing plans for the construction of a new unit at North Akron, Ohio, estimated to cost $500,000, with machinery. Additional furnaces will be installed.

The Davis Equipment Co., 50 Church Street, New York, has inquiries out for a car wheel press, capacity about 200 tons; portable crank pin press, and other equipment. W. E. Davis is head.

Bennett & Son, Albany Street and Troy Road, Albany, N. Y., operating an automobile equipment and accessory works, have plans for a one-story addition to cost $25,000. A. L. Delahanty, 17 Steuben Street, is architect. J. Bennett is head.

In connection with rebuilding its plant, on which work has commenced, the Tottenville Copper Co., Tottenville, S. I., has plans for additional buildings, including blast furnace, refining plant and mechanical washing shop, to cost $200,000 with machinery.

The John E. Biggins Co., Inc., 59-65 Ingraham Street, Brooklyn, has plans for a one-story addition to its foundry.

The Library Bureau, 380 Broadway, New York, manufacturer of steel filing cabinets, etc., with main plant at Ilion, N. Y., is arranging for the establishment of a branch plant in a six-story and basement building, 75 x 128 ft., on Flatbush Avenue Extension, Brooklyn, now being completed. It will approximate 65,000 sq. ft. of floor area.

The Taft Motors Corporation, 110 First Avenue, Long Island City, has plans for a new two-story service and repair building, 75 x 92 ft., at Jackson and Twentieth Avenues, Woodside, L. I., to cost $60,000. Louis Sheinart, 194 Bowery, New York, is architect.

The Willys-Overland Co., Inc., 1631 Broadway, New York, with main plant at Toledo, Ohio, is disposing of a bond issue of $10,000,000, a portion of the proceeds to be used for extensions and improvements. John N. Willys is president.

The Jackwill Mfg. Co., 615 East 134th Street, New York, manufacturer of pipe nipples and kindred engineering products, has purchased property on 140th Street, near the Southern Boulevard, 75 x 120 ft., as a site for a new plant.

The Campbell Refining Corporation, 250 West Fifty-seventh Street, New York, refined oils, has acquired property at New Hartford, N. Y., heretofore held by the New Hartford Canning Co., for a new plant.

Manual training equipment will be installed in the new two and three-story Washington Irving high school to be erected at Tarrytown, N. Y., to cost $200,000, for which bids are being asked on a general contract until Oct. 1. Guilbert & Betelle, Chamber of Commerce Building, Newark, N. J., are architects.

Joseph A. McCarthy, 14716 Jamaica Avenue, Jamaica, L. I., manufacturer of heating apparatus, etc., is planning for the installation of equipment for plating copper, nickel, etc.

The Transit Commission, 49 Lafayette Street, New York, is arranging for an award of contract to the McHarg-Barton Co., 1328 Broadway, low bidder for construction of car building and repair shops at Lenox Avenue and 118th Street, for the Interborough Rapid Transit system, at a price of $960,000.

The Baker Mfg. Corporation, Saratoga Springs, N. Y., manufacturer of gray iron castings, etc., plans for the installation of a 10-ton traveling crane, at its one-story foundry addition on Ballston Street, 50 x 90 ft., estimated to cost $45,000 with equipment. A list of other machinery will soon be arranged.

Manual training equipment will be installed in the new three-story high school to be erected at Scotia, N. Y., estimated to cost $250,000, for which ground will be broken at once. J. M. Ryder, Parker Building, Schenectady, N. Y., is architect.

J. E. Egert, engineer for the Atlantic Industrial Alcohol Co., New York, care of Floyd S. Corbin, 300 Madison Avenue, will take bids for the construction of the new plant on the Arthur Kill Road, Tottenville, S. I., estimated to cost $200,000 with machinery.

The Little Falls Fibre Co., Cohoes, N. Y., is planning for the installation of a condenser and other equipment at its plant in the Northside section.

The Dempsey Furnace Co., 15 Park Row, New York, manufacturer of industrial furnaces, is arranging for the establishment of a new plant at Jersey City, N. J.

Manual training equipment will be installed in the two-story high school to be erected at Central Avenue and Lincoln Street, Orange, N. J., estimated to cost $850,000, for which bids will be called in October. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Fire, Sept. 8, destroyed a portion of the plant of the General Woodcraft Co., Thirty-ninth Street and Second Avenue, North Bergen, N. J., with loss estimated at $100,000 including machinery. Plans for rebuilding are under consideration.

The Utility Lock Washer Co., 140-44 Pennington Street, Newark, N. J., has plans for the erection of a new one-story factory. A one-story power house will also be built. Monks & Johnson, 99 Chauncy Street, Boston, are architects.

The Yellow Cab Co., 11 Centre Street, Newark, has plans for a one-story service and repair building at Sussex Avenue and Summit Street, 170 x 220 ft., to cost about $55,000. E. H. Miller is president.

New England

BOSTON, Sept. 17.

THE machine tool business in this territory, so far as it relates to purchases by New England users, has suffered a relapse. Reported sales were very largely of single machines, with used equipment somewhat more in demand. Fundamental conditions in New England have not changed since last reports, although considerable pessimism has developed in banking circles, which naturally is reflected among manufacturers. New England machine tool dealers are of the opinion that the lull in buying is temporary, and some sizable active prospects give promise of closing before the end of September.

Prices for machinery are steady and unchanged. List prices on the Armstrong line of lathes have been just about doubled, but a liberal discount is now allowed, so the net difference represents an advance of not more than 5 per cent.

The Crane Market

The market on both overhead and locomotive cranes is extremely quiet, with few new inquiries reported and little or no business placed this week. Among the recent inquiries was one from the Erie Railroad, 30 Church Street, New York, for a 5-ton hand power crane for the Pennsylvania Coal Co. The Northern States Power Co. has closed on a 100-ton, 59-ft. span overhead traveling crane and the Edward G. Budd Mfg. Co., Philadelphia, which recently purchased a list of several overhead cranes, has closed on a 10-ton 20-ft. span, 3-motor overhead crane.

Among recent purchases are:

United Shoe Machinery Co., Beverly, Mass., a 5-ton, 28-ft. span electric crane from the Shepard Electric Crane & Hoist Co.

Phoenix Utility Co., 71 Broadway, New York, a 4-ton, single I-beam, hand power crane with electric chain hoist from the American Engineering Co.

New York Central & Hudson River Railroad, New York, a 25-ton gantry crane from an unnamed builder.

Lee C. Moore & Co., Pittsburgh, a 5-ton, 38-ft, 7½-in. span crane from the Case Crane & Engineering Works.

Chicago, Burlington & Quincy Railroad, one 20-ton overhead electric traveling crane for the West Burlington, Iowa, shop to Shaw Crane Co.

John J. Grothe Co., Inc., Everett Street, Woburn, Mass., truck manufacturer, has completed plans for a one-story and basement factory, 100 x 200 ft. A. B. McKay is general manager.

The New Bedford Welding & Machine Co., 1 Rodman Street, New Bedford, Mass., contemplates alterations to its plant and the addition of equipment.

Cranes of 3-ton capacity will be installed in Building 26-F being erected by the General Electric Co., Pittsfield, Mass. The plant will be used for the vacuum treatment of small transformers.

Holyoke, Mass., has indefinitely postponed the erection of a vocational school, plans for which have been submitted for bids.

The resumption of work toward the completion of the Southern New England Railway from Palmer, Mass., to Rhode Island Tidewater has revived plans for the establishment of a machine shop at some point along the road. The company is a subsidiary of the Grand Trunk Railway.

The P. & F. Corbin Co., New Britain, Conn., a subsidiary of the American Hardware Co., will make alterations and repairs to its plant at an estimated cost of $60,000. The American Hardware Corporation will erect a cooling plant on Park Street to cost approximately $15,000.

Bids will shortly be asked on a new school to be erected on the Hawley grammer school grounds, Northampton, Mass., plans for which call for manual training departments.

The New York, New Haven & Hartford Railroad Co., Union Station, Providence, R. I., will build a new engine house and repair shop at Oriental and Charles Streets.

The Cumberland County Power & Light Co., Congress Street, Portland, Me., is planning the construction of a new power house estimated to cost $50,000.

Manual training equipment will be installed in the new two-story high school to be erected at Gorham, N. H., estimated to cost $100,000, for which a general contract will soon be let. Wilson Potter, 22 East Seventeenth Street, New York, is architect.

Manual training equipment will be installed in the proposed two-story high school to be erected at Newmarket, N. H., estimated to cost $100,000. The J. H. Bickford Co., 6 Beacon Street, Boston, is architect, and will soon call for bids on a general contract.

The Eastern Machine Works, 24 Marshall Wharf, Lynn, Mass., has inquiries out for a high pressure oil pump with capacity of about 3000 lb. per sq. in., and one hydraulic accumulator, about 3000 lb. capacity, used, in good condition.

The Quality Grinding Co., Springfield, Mass., has taken over a branch of the business of the Charter Oak Machine Co., Hartford, Conn., covering cylinder grinding and motor parts and specialties, and will concentrate and expand operations at its Chestnut Street plant. Clifford Loud is head.

The Connecticut Co., 22 Church Street, New Haven, Conn., operating a motor bus line, has awarded contract to C. A. Sibley & Co., New Haven, for a one-story machine and repair shop, 68 x 208 ft., at Grant Avenue and Haven Street, to cost $60,000. It will also be used for parts manufacture.

The Katahdin Electric Co., Patten, Me., recently organized, plans the construction of a power plant and system in a portion of Penobscot County. Raymond D. Gardner is president.

The Weir Stove Co., Taunton, Mass., is considering the erection of a one-story building, 52 x 102 ft.

Bids will be received by the Metropolitan District Commission, Commonwealth of Massachusetts, 1 Ashburton Place, Boston, until Oct. 4 for a cross-compound, crank and flywheel condensing pumping engine, with daily capacity of 20,000,000 gal. for installation at Spot Pond.

Baltimore

BALTIMORE, Sept. 17.

THE Chestertown Development Co., Chestertown, Md., has inquiries out for a boiler, locomotive type, with auxiliary equipment.

The Navy Supply Officer, Washington Navy Yard, will take bids at once for three motors, three automatic starting compensators, three flexible couplings and four electric transformers, N. S. A. F. requisition 83; also for 3750 ft. phosphor bronze cable and 10 lengths of galvanized chain, N. S. A. F. requisition 80.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until Sept. 24, for a quantity of tools and equipment, including 144 machinists' hammers, 24 pairs tinners' shears, 24 breast drills, 24 hand drills, 80 blacksmiths' punches, 20,000 ft. galvanized steel conduit and 25,000 ft. of copper wire, circular 2332.

The North Beach Electric Light & Power Co., North Beach (Calvert County), Md., recently organized, contemplates the installation of a plant and system for service in this section. The company is headed by William J. Duncan and Augustus C. Breitenstein, both of North Beach.

The Chesapeake & Ohio Railroad Co., 823 East Main Street, Richmond, Va., is planning to purchase a 20-ton locomotive crane. H. C. Pearce is director of purchases and stores.

The Bristol Ice & Coal Co., Bristol, Va., recently organized, is contemplating the construction of a new ice-manufacturing plant, 60 x 100 ft., at Commonwealth and Euclid Avenues. R. F. Wagner is president.

Fire, Sept. 8, destroyed a portion of the plant of the Henderson Veneering & Mfg. Co., Henderson, N. C., manufacturer of coat hangers, etc., with loss estimated at $25,000. It is planned to rebuild.

The Nottaway Shook Co., Blackstone, Va., is planning to rebuild the portion of its plant recently destroyed by fire and is inquiring for box-manufacturing machinery and other equipment.

The Bureau of Yards and Docks, Navy Department, Washington, is preparing plans for a new pumping plant at the naval property, Dahlgren, Va., and will soon take bids, specification 4904.

A machine shop will be installed in the new automobile service and repair building to be erected at Washington by M. Cafritz, 913 Fifteenth Street, N. W., estimated to cost $200,000, for which plans have been prepared by H. H. Warnick, 1108 Sixteenth Street, N. W., architect.

The Western Paper Makers' Chemical Co., Kalamazoo, Mich., will remodel the plant of the Grecian-American Turpentine Co., Savannah, Ga., recently acquired, and install machinery for rosin-sizing and other operations. The company operates plants at Jacksonville and Pensacola, Fla. O. E. Scott will act as manager at Savannah.

The Board of District Commissioners, Washington, will take bids until Sept. 25 for woodworking machinery and other manual training equipment for the Eastern junior high school; until Sept. 27 for one truck loader, one power grader and other road machinery.

The Pigeon River Power Co., Waynesville, N. C., has preliminary plans for a hydroelectric power house on the Pigeon River, near Waterville, N. C., with initial capacity of 50,000 hp. A steel tower transmission system will be built for service at Asheville, N. C., and vicinity. Francis R. Weller, Mills Building, Washington, D. C., is consulting engineer.

J. W. Evans, East Morgan Street, Raleigh, N. C., is planning the erection of a two-story machine and repair shop at Blount and Morgan Streets, 100 x 100 ft., estimated to cost $50,000.

A company is being formed to take over the plant of the Hess Steel Corporation, Biddle Street and Loney's Lane, Baltimore, for the manufacture of a new line of steel products. It has been practically idle since July, 1920, when a receiver was appointed for the Hess company.

The Common Council, Gastonia, N. C., is planning for a bond issue of $200,000 for the construction of a municipal electric power plant and electrically-operated waterworks. B. H. Parker is mayor.

The Blue Ridge Mica Co., Winston-Salem, N. C., is perfecting plans for the construction of a local plant, with power house, estimated to cost $250,000 including machinery.

The Consolidated Ice & Fuel Co., Union, S. C., is planning for the installation of electrically-operated machinery at its plant, to replace present steam-driven apparatus. R. L. McNally is treasurer.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 2 for one apron feeder and motor, for the Annapolis Navy Yard, schedule 1301; until Sept. 25 for 500 7-in. scythe cutting pliers, for the Hampton Roads Navy Yard, schedule 1300; and until Oct. 9 for 1660 lb. of magnet wire, for the Mare Island Navy Yard, schedule 1303.

W. L. Duncan, 347 Arcade Building, Norfolk, Va., is making inquiries for drag and belt-driven types of portable conveyors and desires to get in touch with manufacturers of such equipment.

The Tom Houston Mfg. Co., Columbus, Ga., has inquiries out for a number of chain hoists, 1 and ½-ton capacities.

The Clinch River Coal Corporation, Coeburn, Va., has acquired the local properties of the Odle Coal Co. and plans for the installation of electric power and other equipment. William J. Jegen, Edge Hill, Pa., is president of the purchasing company.

The Paul Rubber Co., Salisbury, N. C., is planning for the establishment of new works for the manufacture of automobile tires.

Philadelphia

PHILADELPHIA, Sept. 17.

INQUIRIES are being made by C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, for one air compressor, 250 to 500 cu. ft. capacity, direct-connected to electric motor, or belted type.

Bids will be received by the Quartermaster Department, Intermediate Depot, Twenty-first Street and Oregon Avenue, Philadelphia, until Sept. 26 for the installation of oil burning equipment at the central heating plant, United States Army depot.

The Philadelphia & Reading Railway Co., Reading Terminal, Philadelphia, has plans for the construction of a machine and mechanical shop on Huntingdon Street estimated to cost $75,000, including equipment. It will soon commence the construction of its new elevator at Port Richmond, estimated to cost $1,500,000 with loading, conveying and other equipment.

Bids will be received by the Department of Public Works, City Hall, Philadelphia, until Sept. 25 for a new electrically-operated pumping plant on Germantown Avenue for auxiliary waterworks service.

The Metalweld Service Corporation, 1435 North Thirty-first Street, Philadelphia, operating a welding and general metal works, has acquired property at Hunting Park Avenue and Fox Street for $60,000 as a site for a new factory, for which plans will soon be prepared.

Officials of the Penn Seaboard Steel Corporation, Franklin Bank Building, Philadelphia, are perfecting plans for a reorganization of the company under the name of the Penn Steel Castings Co., with capital of $500,000. It will take over and expand the plant of the Penn Seaboard company at Chester, Pa., and purposes to develop large capacity for steel castings.

A list of electric power equipment, transmission and other equipment will soon be arranged for installation in the nine-story addition now in course of erection by Stephen F. Whitman & Son, Inc., Philadelphia, manufacturer of chocolate and confectionery products, estimated to cost $750,000 with equipment. Walter S. Sharp is president.

The Wood Brothers Ice Mfg. Co., Tamaqua, Pa., has preliminary plans for rebuilding the portion of its plant recently destroyed by fire with loss estimated at $40,000, including equipment.

The Hardinge Conical Mill Co., 120 Broadway, New York, manufacturer of grinding mills, etc., has perfected plans for the concentration of operations at its plant at York, Pa., including the removal of headquarters to this location. All branches of manufacture, including parts and assembling, will be carried out at this works.

Manual training equipment will be installed in the new junior high school to be erected at New Philadelphia, Blythe Township, Pa., estimated to cost $200,000. The Board of Education is in charge.

The Metropolitan Power Co., Reading, Pa., a subsidiary of the Metropolitan Edison Co., will install a 37,500 kva. turbo-generator, five 1500-hp. boilers, with steel tube econo-

mizers, pumping machinery and other equipment at its new generating plant on the Susquehanna River, at Middletown, Pa., for which superstructure work is now under way. The initial plant is expected to be completed next summer, and shortly thereafter another 37,500 kva. generator will be installed, and additional units later until the ultimate capacity of 200,000 kw. is available. It will cost $500,000, including transmission lines.

The Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, is perfecting plans for the construction of a new coal washery at its properties near Shamokin, Pa.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa., is planning for extensions in its electric plant and system to cost $125,000 with equipment.

Following the purchase of the two foundries of the late Edwin A. Moore at Fort and Robeson Streets, Reading, Pa., and at Spring City, Pa., by the Textile Machine Works, Wyomissing, Pa., the last noted plant has been disposed of to a new company now being organized by M. M. Marcus. Early possession will be taken, improvements made and the foundry placed in operation by the new organization. The Textile Machine company will operate the Reading foundry.

Manual training equipment will be installed in the new high school to be erected at Hyde Park, Muhlenberg Township, Pa., estimated to cost $100,000, for which Richter & Eller, Philadelphia, are architects.

The Penn Central Light & Power Co., Altoona, Pa., is contemplating extensions in its plant and system in the vicinity of Lewistown, Pa.

Buffalo

BUFFALO, Sept. 17.

BIDS will be received by the Superintendent of Light Houses, United States Light House Service, Buffalo, until Sept. 24 for one oil engine-driven electric generator and one electric motor-driven air compressor unit, as per specifications on file.

The Buick Motor Corporation, 1100 Main Street, Buffalo, has awarded a general contract to Cooker & Carpenter, Crosby Building, for a two-story service and repair building estimated to cost $75,000.

The Cutler Ice Co., Front Street, Binghamton, N. Y., has tentative plans for an addition estimated to cost $50,000.

The Jewett Refrigerator Co., 27 Chandler Street, Buffalo, will build an addition, 40 x 60 ft., to its plant at Lackawanna, N. Y., to provide for additions in its line of products.

Arthur W. Kreinheder, commissioner of public works, Buffalo, will receive bids until Oct. 23 for electrically operated centrifugal pumping machinery for the local waterworks, including two units, each with capacity of 75,000,000 gal. per day; and others with a capacity of 45,000,000 gal., 30,000,000 gal., 15,000,000 gal., 8,500,000 gal., and one unit of 3,500,000 gal., with 10 switchboard panels and auxiliary electrical apparatus. Fuller & McClintock, 170 Broadway, New York, are consulting engineers.

The Art Work Shop, 828 East Ferry Street, Buffalo, manufacturer of metal products, is planning the erection of an addition, 20 x 80 ft., with installation of a drop hammer, cutting machines and other equipment, all electrically operated. H. B. MacFarland is president.

The Buffalo Creek Railroad Co., Lehigh Valley Railroad Terminal, Buffalo, is planning for a new engine house and repair shop, 80 x 85 ft., on Buffalo Creek.

The new plant of the Ontario Paper Co., Thorold, Ont., on Little Island, North Tonawanda, N. Y., will consist of a main building, 150 x 400 ft.; machine department, 93 x 380 ft.; beater department, 130 x 145 ft., and power house. Excavations will begin at once. The plant will cost $2,000,000 with machinery, and will be operated in the name of the Daily Newsprint Corporation, a subsidiary. Warren Curtis is general manager.

John C. Breker, Buffalo, is planning for the establishment of a metal-manufacturing and plating works in the two-story building, 20 x 55 ft., at 132 Spruce Street, and will soon commence the installation of equipment.

The Paige Sales Co., Cortland Street, Rochester, N. Y., local representative for the Paige automobile, will install a machine shop in its two-story service and repair building, 60 x 100 ft. H. R. Stewart is president.

The Northern Oil & Fuel Corporation, 337 State Street, Watertown, N. Y., is contemplating the erection of a branch plant at Lowville, N. Y., estimated to cost $75,000. G. W. Lane is president.

The Board of Trustees, Orchard Park, N. Y., has tentative plans for the installation of electrically operated pumping machinery, steel water tank and tower and other equipment, in connection with a proposed municipal waterworks to cost about $215,000.

The Walker Repair Shop, Ferguson and Muir Streets, Niagara Falls, N. Y., T. H. Routh in charge, is planning for the installation of small tools and other machine shop equipment.

The Harrison Radiator Corporation, Lockport, N. Y., manufacturer of automobile radiators, has filed plans for a new unit, duplicating its present works and designed to double the capacity, estimated to cost $300,000 including machinery.

The Symington gun manufacturing plant, University Avenue, Rochester, N. Y., inactive since the war, owned by the Gleason Works, Inc., and the Todd Protectograph Co., has been sold to the Monroe Warehouse Co. for $300,000, of which about $100,000 represents buildings and equipment. The new owner purposes to use the plant for automobile service.

W. J. Kinekenberg, 279 Niagara Street, Buffalo, has inquiries out for two hoisting engines, each with two drums.

A machine shop will be installed in the two-story automobile service and repair building to be erected on Main Street, Lockport, N. Y., 54 x 100 ft., by Cole Brothers, Lockport, for which plans have been prepared by Nichols & Gardinier, 46 North Pearl Street, Albany, N. Y.

The Spencer Lens Co., 442 Niagara Street, Buffalo, is arranging for extensions to manufacture a new motion picture machine to be known as the Automatic Delineascope. The fifth floor of the present plant, heretofore leased to outside interests, will be taken over and equipment installed for the new department.

Pittsburgh

PITTSBURGH, Sept. 17.

LOCALLY, the machine tool market lacks activity and new features. There is a fair number of single tool orders, but action is still deferred on lists which have been out for several weeks. Most interest centers around the list of the Pennsylvania Railroad, Central Region, embracing 34 tools for shops in and around Pittsburgh. This road recently closed for a journal truing machine for its Pitcairn shop, which was not included in the list issued about six weeks ago. The Lorain Steel Co., Johnstown, Pa., has not yet closed on two heavy frog and switch planers. The Petroleum Iron Works, Sharon, Pa., which is constructing a fabricating shop at Beaumont, Tex., is reported to have closed for a multiple-type beam punch and a spacing table with the Thomas Spacing Machine Co., Pittsburgh, and for several punches and shears with the Cleveland Punch & Shear Co., Wickliffe, Ohio.

The week has been dull in cranes and other heavy equipment, and there have been no new orders for power equipment of any consequence.

Tentative plans are being considered by the Consolidated Motors Corporation, 117 Flavel Street, Pittsburgh, W. O. Dayton, vice-president, for a new assembling plant at New Castle, Pa., where a site will be selected.

A machine shop will be installed in the two-story service and repair building, 85 x 125 ft., to be erected by the McGraw Co., 10-12 South Broadway, Wheeling, W. Va., local representative for the Ford automobile, estimated to cost $75,000. F. F. Harris, Wheeling Steel Corporation Building, is architect. Robert W. McGraw is general manager.

The Jeffrey-Dewitt Insulator Corporation, Kenova, W. Va., has leased the former plant of the Ferguson Shipbuilding Co., Abbott Road and the Buffalo River, Buffalo, for the establishment of a new plant. The buildings will be remodeled and production will be devoted to the manufacture of electric switches. It is purposed to make this the main plant of the company for such line. Jesse E. Sinclair will be general manager.

The French Sand Dryer Co., Keystone, W. Va., recently organized, has tentative plans for a local foundry to manufacture special iron castings. C. S. French and S. A. Christie, Keystone, head the company.

The Western Electric Co., 910 River Avenue, Northside, Pittsburgh, has leased a five-story building, 65 x 158 ft., to be erected on West Street, totaling about 50,000 sq. ft., for new works. It will be ready for occupancy about Dec. 1.

The Guyan Machine Shops., Logan, W. Va., machinery dealers, have inquiries out for several portable boilers, 35 to 40-hp., mounted on wheel trucks, with auxiliary equipment.

The Northern Cambria Co., Spangler, Pa., care of Tannett, Seelye & Fleming, Caplan Building, Harrisburg, Pa., engineers, has plans for the installation of an electrically-operated pumping plant to cost about $50,000, with pipe line, etc.

Milwaukee

MILWAUKEE, Sept. 17.

MACHINE-TOOL business is making some progress toward volume, although the process is slow and the course of business continues uneven. Orders come from scattering sources, although inquiry is improving and shows a tendency to broaden. A few large concerns are carrying forward extensive shop and power plant projects, while the large majority of all sizes are marking time in this respect, the main idea being to await a reduction in construction costs. There are few if any large lot inquiries before builders or dealers, and current trade is dependent mainly upon replacement needs. The automotive industries remain the principal source of demand.

The American Skein & Foundry Co., Racine, Wis., is erecting a two-story brick and concrete addition, 40 x 140 ft., to be used largely for the piano plate division which recently was separately incorporated, although remaining in the sole control and ownership of the original company. The general contractors are Nelson & Co., Racine.

The Four Wheel Drive Auto Co., Clintonville, Wis., is buying a few miscellaneous items of equipment, having secured the exclusive right to manufacture and mount on F W D motor trucks the earth-boring machine formerly built by the defunct Winther Motors, Inc., Kenosha, Wis., and sold in liquidation to the International Earth Boring Machine Co., Chicago. The device is used for boring post holes and setting poles and posts for transmission lines, etc.

The Algoma Wood Products Co., Algoma, Wis., will replace its frame and brick factory group with fireproof buildings and contemplates the purchase of considerable new wood and metal-working equipment and additional power plant machinery. Contracts will be let Oct. 1 for the first unit, 60 x 120 ft., two stories and basement. Next spring work will be started on a similar unit and a battery of dry kilns. The capital stock has been increased from $50,000 to $100,000 to finance the work. Charles Schmitt is secretary and general manager.

The Triangle Mfg. Co., Oshkosh, Wis., will buy a few items of additional equipment for a new department which will manufacture a patented hospital bed designed by George C. Hume and Peter Enders, Chilton, Wis. No plant enlargement is contemplated for the present. F. J. Sullivan is president and general manager.

The Cedarburg Dairy Co., 1028 Central Avenue, Milwaukee, has purchased several buildings of the Cream City Brewing Co. group at Thirteenth and Cherry Streets. It will do extensive remodeling and will require complete new pasteurizing equipment, tanks, conveyors, refrigerating machinery, etc. The total investment will be in excess of $150,000. Henry Berns is president.

The Lakeside Malleable Casting Co., Racine, Wis., has started work on a foundry addition, 40 x 140 ft., and will also remodel the present works at an estimated cost of $75,000. The work is in charge of Edmund B. Funston & Co., local architects and engineers.

The Board of Education, River Falls, Wis., has selected Jacobson & Jacobson, architects, 127 Auditorium Building, Minneapolis, Minn., to design the proposed new $225,000 high school to be erected early in 1924. The building will accommodate manual training and other vocational shops. George T. Smith is chairman of the board.

The Gold Medal Camp Furniture Co., Racine, Wis., manufacturer of metal and wood camping equipment, will build a power plant addition, 24 x 42 ft., and is in the market for some supplementary equipment. A factory addition probably will be erected next spring.

The Glancy Malleable Corporation, incorporated recently at Waukesha, Wis., with a capital of 1000 shares of common stock without par value, has taken over the business of the Waukesha Malleable Iron Co., which has been operated under a five-year lease by the General Motors Corporation. Originally the plant furnished castings to the Samson Tractor Co., Janesville, Wis., which has been liquidated and the works turned over to the Chevrolet and Fisher Body divisions. A. R. Glancy, who was general manager of the Waukesha foundry for the General Motors interests, becomes president and general manager of the new concern. L. A. Williams is vice-president; E. F. Carsob, treasurer, and L. D. Harkider, secretary.

The Kickapoo River Power Co., LaFarge, Wis., has been organized with an initial capitalization of $25,000 to develop a water power near LaFarge and build a hydroelectric generating plant on the Kickapoo River. Plans are being prepared by Mead & Seastone, consulting engineers, Madison, Wis. The principals are E. E. Woodard of LaFarge, and L. C. Fleck and E. E. Dillon, Madison.

The Board of Industrial Education, Appleton, Wis., expects to take bids after Oct. 1 for the construction of two junior high and vocational training schools, estimated to cost in the aggregate about $550,000. Plans are being completed by Perkins, Fellows & Hamilton, architects, 814 Tower Court, Chicago. Henry Reuter is president of the board.

The Prime Mfg. Co., Milwaukee, is contemplating the erection of a brass foundry of approximately 15,000 to 18,000 sq. ft. No definite plans have as yet been made.

Chicago

CHICAGO, Sept. 17.

THE market remains quiet except for occasional purchases of one or two machines. Industrial companies continue busy and apparently could use additional equipment, but are hesitant about making purchases at this time. There is still considerable second-hand equipment in the market, which is frequently bought instead of new tools. There has been no further railroad buying, and some lines which were counted on to place orders have inaugurated a policy of retrenchment in all departments. The Sinclair Refining Co. is in the market for a list of miscellaneous equipment, including a steam hammer, a bulldozer, a 24-in. upright drill and a hack saw. Frank D. Chase, engineer, Chicago, is inquiring for an open-side planer for one of his clients.

The Chicago Steel & Wire Co., 106th Street and Torrence Avenue, Chicago, is adding a wire-weaving unit, 60 x 239 ft., to its plant.

The New York, Chicago & St. Louis Railroad is building a one-story extension to its shop, 99 x 157 ft., at Ninety-third and Stony Island Avenue, Chicago.

The National Steel Door Co., 26 West Austin Avenue, Chicago, has leased a one-story plant containing 20,000 sq. feet at 4241 Ogden Avenue.

J. D. Wallace & Co., machinery manufacturer, 1401 West Jackson Boulevard, Chicago, will receive bids through C. W. Lampe, 155 North Clark Street, on a one-story factory, 112 x 150 ft., at the northwest corner of Adams Street and California Avenue, to cost $50,000.

The Protecto Mfg. Co., 5206 West Kinzie Street, Chicago, is having plans prepared for a one-story factory, 25 x 125 ft., on West Lake Street, near Long Avenue, to cost $15,000.

The George F. Marchant Co., machinist, Fourteenth and Rockwell Streets, Chicago, has let contract for a one-story factory, 73 x 124 ft., on the northwest corner of Fourteenth Place and Rockwell Street, to cost $15,000.

The Reliance Stove Co. has awarded a contract to Weslo, Wagstad & Carlson, 1743 North Crawford Avenue, Chicago, for a one-story factory, 80 x 125 ft., at 1917-25 Bloomingdale Avenue, to cost $25,000.

The Common Council, Le Sueur, Minn., has tentative plans for the construction of a municipal electric power plant.

Manual training equipment will be installed in the new two-story junior and senior high school to be erected at Fairbury, Neb., estimated to cost $200,000, for which excavations will begin at once. Fiske & Meginnis, Bankers' Life Building, Lincoln, Neb., are architects.

Cohn Brothers, 911 Commercial Street, Waterloo, Iowa, are having plans drawn for a one-story machine shop, 60 x 70 ft. Bartley & Pediford, 218 L. & J. Building, are architects.

Manual training equipment will be installed in the new two-story high school to be erected at Waseca, Minn., estimated to cost $450,000, for which bids will be asked on a general contract in October. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Western Cartridge Co., East Alton, Ill., has inquiries out for a steam boiler and auxiliary equipment, about 165 hp., Scotch marine or similar type.

The Common Council, Washington, Iowa, is planning for the installation of electrically-operated pumping equipment in connection with extensions and improvements in the municipal water works, estimated to cost $80,000. Arthur L. Mullergren, 555 Gates Building, Kansas City, Mo., is consulting engineer.

The Great Northern Railway Co., St. Paul, Minn., is considering the construction of a new one-story machine and repair shop at Minot, N. D., estimated to cost $85,000. R. A. McCandless, superintendent of the Minot Division, is in charge.

The Holland Furnace Co., Holland, Mich., manufacturer of furnaces, stoves, etc., will commence the erection of an addition to its plant at Cedar Rapids, Iowa, to double the present output, estimated to cost $100,000.

Cleveland

CLEVELAND, Sept. 17.

THE improvement shown in the machinery market at the beginning of the month has not kept up, and the past week was generally quiet. There were few sales outside of single tools and not much in the way of new inquiry. The Cleveland Stone Co. has sent out a list of eight machines for a shop at Amherst, Ohio, which is the largest new inquiry. It includes a 14 and 16-in. lathe, a 4-ft. radial drill, a small drilling machine, milling machine, shaper and slotting machine. The Nickel Plate Railroad placed one machine, a turret lathe, with a Cleveland manufacturer and still has a number of machines to purchase on its recently issued list. The Humphrey Mfg. Co., Mansfield, Ohio, is planning the erection of a foundry and machine shop for use in the manufacture of cast iron bathtubs and other sanitary ware and will probably purchase several machine tools.

A Detroit automobile company purchased close to a dozen machines the past week, and some fair sized lots are pending in that city. Other purchases include six used hand screw machines by the Remy Electric Co., Anderson, Ind., the order being taken by a Cleveland dealer.

The equipment of the Erie Specialty Co., Erie, Pa., will be offered for sale at auction Sept. 18.

The Pioneer High Speed Knife Co., Cleveland, has been organized by C. G. Willis and J. J. Zoffer and others to manufacture machine knives. The company has leased a factory on West Street, providing approximately 25,000 sq. ft. of floor space. It was formerly occupied by the Great Lakes Welding Co.

The Gripstick Co., Canton, Ohio, has been incorporated with a capital stock of $50,000 to manufacture a combination wrench and plier. H. N. Bigler, Dover, Ohio, is president and Fred P. Potchner, secretary. The company plans to have its product made under contract.

The William Campbell Co., Detroit, Mich., will move to Alliance, Ohio, where it will erect a plant for the manufacture of automatic fireless cookers.

The Cleveland Cap Screw Co., 2921 East Seventy-ninth Street, has awarded contract for the erection of the two-story addition, 66 x 95 ft.

The Union Chain & Mfg. Co., Sandusky, Ohio, is in the market for a 77½ or 78½ Bliss punch press or equivalent, 5-in. to 6-in. stroke.

The Interstate Foundry Co., 3161 East Sixty-first Street, Cleveland, is inquiring for a second-hand, 250-hp. unity power factor, 3-phase, 60-cycle, 440-volt synchronous motor.

Vickery & Vickery, Cleveland Discount Building, Cleveland, attorneys for the stockholders' protective committee of the Whitney Tractor Co., Port Huron, Mich., have placed on sale the entire machine tool equipment of that plant, which is valued slightly in excess of $25,000. The plant will be open for inspection of the machinery until Sept. 22, and bids for all or part of the equipment will be received by Vickery & Vickery until September 29, at which time the machinery will be disposed of to the highest bidders.

Henry Prentiss & Co., 149 Broadway, New York, have been appointed selling agents in the New York territory for the Cincinnati centerless grinder, manufactured by the Cincinnati Milling Machine Co. Prentiss & Co. have represented this company on milling machines for some time.

Cincinnati

CINCINNATI, Sept. 17.

ALTHOUGH the past week has been quiet in the machine tool market, a number of orders, mostly for single machines, has been booked. Several large deals, at least one of which is for export, are said to be nearly completed, but little information is being given out regarding them. Another transaction involving a large number of tools is reported to be about ready to close, but it depends largely on the proper financing. Automobile companies continue to buy for replacement, and it is said that one large manufacturer, which recently brought out its 1924 model, is so booked with orders that it is negotiating for the purchase of a number of plants in various sections of the country, to be used for body-building and for the manufacture of motors and other parts.

That the machine tool industry as a whole showed improvement in August over July is attested by the figures on order books for the two months. July showed an index number of 32.4, while August was 37.6. September, to date, has been dull, but orders now pending are expected to bring the total bookings up to last month's figures.

The property of the Kilbourne & Jacobs Mfg. Co., Columbus, Ohio, which went into receiver's hands early in the year, was sold at public auction for $900,000 to F. R. Huntington, of the Huntington National Bank, Columbus. No statement has been made as to the syndicate for which he acted as agent, but it is understood that the plant will be continued in operation.

The city of Hamilton, Ohio, will spend approximately $700,000 for the erection and equipment of an electric lighting plant. The Froelich & Emery Co., Toledo, are engineers. Plans have been completed and bids for erection will probably be asked within the next few weeks.

Colgate & Co., New York, who recently purchased the building of the Indiana Reformatory at Jeffersonville, Ind., will remodel it for the manufacture of soaps and perfumes. A power house is being erected and numerous tanks for storage purposes will be installed.

Detroit

DETROIT, Sept. 17.

PLANS are being completed for a new works at Pontiac, Mich., by the Fisher Body Co., General Motors Building, Detroit, adjoining a plant recently completed for the manufacture of bodies for the Oakland Motor Co. The new building will be equipped for metal body construction and metal-finishing and is estimated to cost $500,000 with machinery.

The American Plywood Wheel Co., care of the Chamber of Commerce, Howell, Mich., has acquired the Hadden tract of property, near the Pere Marquette Railroad as a site for a new plant to manufacture automobile wheels.

The Kelvinator Corporation, 2051 Fort Street, Detroit, manufacturer of electric refrigerators, has awarded a general contract to Malow Barry, 2631 Woodward Avenue, for a three-story addition, 45 x 96 ft., estimated to cost $85,000. Smith, Hinchman & Grylls, 800 Marquette Building, are architects. H. W. Bailey is secretary.

J. W. Brown, formerly connected with the Couple Gear Co., and P. Honn, previously with the Perkins Machine Co., both of Grand Rapids, have formed the Honn-Brown Co., Inc., to manufacture equipment for automobiles, including wheel removers, etc. Property has been acquired at 416 Scribner Avenue for the new plant.

The C. B. Shepard Co., 89 Moss Avenue, Highland Park, Detroit, has inquiries out for a used hydraulic press, 700 to 1000 tons' capacity.

The Mack International Motor Truck Co., 628 Forest Avenue, Detroit, has leased a one-story building, 195 x 385 ft., to be erected on the Grand River Boulevard, for a new service and repair work. It will cost about $150,000.

The Trail-Ford Corporation, Ann Arbor, Mich., formerly known as the Automotive Utilities Corporation, has secured a plant, with site of about seven acres, for the manufacture of special wheel equipment, axles and other specialties for the Fordson tractor. Tentative plans are under advisement for an addition, for which ground will be broken early in the coming year, to provide about 45,000 sq. ft. of additional space. A. R. Thomas is vice-president.

Electrically-operated machinery will be installed in the new pumping plant, to be erected by the Wayne County Road Commission, Real Estate Exchange Building, Detroit, at Lincoln Park, Mich., estimated to cost $45,000. H. A. Shuptrime is engineer for the commission.

The National Steel Products Co., 2270 Franklin Street, Detroit, has purchased the plant of the Ground Hog Tractor Co., Holly, Mich., a defunct organization, for the establishment of new works. Machinery will be installed at once for the manufacture of a line of steel products for automobiles.

Indiana

INDIANAPOLIS, Sept. 17.

PLANS are being perfected by the All-Rite Co., Virginia Avenue, Indianapolis, manufacturer of electrical products, for the removal of its works to 418 South Pennsylvania Street, where additional equipment will be installed for larger output.

The Kolograph Co., Indianapolis, will establish a machine shop at 216 East Maryland Street, for the manufacture of motion picture machines and parts.

A machine shop will be installed in the new two-story service and repair building at 530-32 South Meridian Street, Indianapolis, now in course of construction, by Smith & Moore, Inc., 259 South Meridian Street, local representative for the Ford automobile. It will cost about $100,000.

The Spacke Machine & Tool Co., Indianapolis, David Spacke, head, has disposed of its two-story building at Madison Avenue and Merrill Street, for $100,000, and it will be remodeled for another line of business. The Spacke company has been operating under the direction of Charles O. Roemler, receiver, who is liquidating the property.

Michael Seyfried, Indianapolis, has arranged for the establishment of a new plant at 3320 East New York Street, for the manufacture of sheet metal products.

The Common Council, Jasonville, Ind., is planning for the installation of electrically-operated pumping machinery in connection with a new waterworks plant estimated to cost $150,000. A. Simms is consulting engineer for the city.

Hedderich Brothers, Bond Street, Evansville, Ind., operating a brass and bronze foundry, are said to be arranging a list of equipment for installation in their proposed one-story addition.

The Indiana Electric Corporation, Indianapolis, has disposed of a bond issue of $27,000,000, a portion of the proceeds to be used for electric power plant construction, extensions, etc.

L. P. Hartzell, Hoagland, Ind., has tentative plans for rebuilding his tile manufacturing plant and power house, partially destroyed by fire with loss of about $25,000, including equipment.

The Central South

ST. LOUIS, Sept. 17.

WORK will commence on the new cement manufacturing plant to be erected at Bonner Springs, Kan., by the Kansas Portland Cement Co., 1608 Federal Reserve Bank Building, Kansas City, Kan., estimated to cost $1,000,000 with machinery. The installation will include a power plant. The McDonald Engineering Co., 533 West Jackson Boulevard, Chicago, will be in charge of the work. The company is operated by the International Cement Co.

The American Aluminum Co., 305-7 South Seventh Street, St. Louis, has tentative plans for rebuilding the portion of its works recently destroyed by fire with loss estimated at $135,000, including equipment.

The Atlantic Ice & Coal Co., Chattanooga, Tenn., will commence the construction of a four-story addition to its ice-manufacturing plant, 80 x 80 ft. Other units will be built later.

Fire, Sept. 8, destroyed the power house and plant of the Union Sash & Door Co., Cape Girardeau, Mo., and adjoining property of the Forrest Lumber Co., an affiliated organization, with loss estimated at $250,000, including equipment. It is planned to rebuild.

Ovens, power equipment, conveying and other machinery will be installed in the new three-story and basement plant, 75 x 100 ft., to be erected by the Jordan Baking Co., Topeka, Kan., estimated to cost $100,000, for which bids will soon be asked. W. E. Glover, Stormont Building, is architect.

A machine shop will be installed in the three-story service and repair building, 135 x 166 ft., to be erected on Washington Street, St. Louis, by the Tate Motor Co., 3111 Locust Street, estimated to cost $200,000. The Widmer Engineering Co., Laclede Gas Building, is engineer. F. R. Tate is president.

The Common Council, Lawrenceburg, Tenn., is perfecting plans for a municipal electric power house on Shoal Creek, estimated to cost $80,000. Bids will soon be asked by Freeland-Roberts, Inc., Nashville, Tenn., engineer.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, has plans for the first of its proposed group of three branch buildings on Vandeventer Street, St. Louis, to be two and three stories, estimated to cost $225,000 with machinery. Kleipstein & Rathmann, Chemical Building, St. Louis, are architects.

The Kelleys Ferry Coal Co., 322 First National Bank Building, Chattanooga, Tenn., is planning for the installation of electric power and general mining machinery at its coal properties. W. J. Nixon is president and treasurer.

C. E. Carroll, Newport, Ark., has inquiries out for automatic oiling equipment for electric machinery and automatic governor controls, and desires to get in touch with manufacturers of such products.

The Eagle River Coal Mining Co., Oliver Spring, Tenn., recently organized with a capital of $250,000, is planning for the installation of electric power equipment, hoisting and other mining machinery at its properties. W. A. Montgomery and J. E. Wood head the company.

The Board of Directors, Deaner Institute, 3520 Broadway, Kansas City, Mo., is planning for the installation of a universal woodworking machine. P. M. Oriopp is in charge.

The Henrici-Lowry Engineering Co., 1222 Commerce Building, Kansas City, Mo., is preparing plans for the installation of a quarry and crushing plant at Murfreesboro, Ark., for a company whose name will be announced later. The installation will include a steam-operated power plant, pumping machinery, hydraulic mining equipment, loading and crushing machinery, and auxiliary equipment.

The Clinchfield Portland Cement Co., Kingsport, Tenn., has acquired the cement and lime plant and machinery of W. E. Culbert, near Perry, Ga., and will use the equipment in connection with its new plant on property recently acquired in this section. Considerable additional equipment will be installed at the projected plant, designed to develop an output of 4000 bbl. per day. It is estimated to cost $2,500,000.

The Warren Steel Casting Co., Fairview Avenue and the Kingshighway, St. Louis, has completed plans for a new two-story foundry, 93 x 256 ft., estimated to cost $55,000, including equipment. O. J. Popp, Odd Fellows Building, is architect.

The Western Electric Co., Hawthorne, Chicago, has acquired 15 acres at East Nashville, Tenn., and has tentative plans for the erection of new branch works.

The Gulf States

BIRMINGHAM, Sept. 17.

ERECTION will commence on a new one-story ice-manufacturing plant on South Twelfth Street, Corsicana, Tex., 90 x 150 ft., by the Navarro Ice Co., Corsicana, estimated to cost $100,000 including machinery.

The Electric Appliance Co., Dallas, Tex., has been organized to take over and consolidate the local company of the same name and the Electric Specialty Co., to specialize in the production of automotive electrical equipment and supplies. The new company will operate with a capital of $90,000. Charles L. Martin is secretary and general manager.

The Riftclimber Boat Co., Mount Alto, Pa., manufacturer of motor boats, etc., is concluding negotiations for a lease of property on Lake Harris, Leesburg, Fla., for the establishment of a branch plant.

The Western Service Corporation has acquired the municipal electric power plant at Franklin, Tex. Extensions will be made, including the installation of additional transmission lines. Headquarters of the purchasing company are at Calvert, Tex.

The Board of Supervisors, Noxubee County, Macon, Miss., John A. Tyson, clerk, will receive bids until Oct. 1 for one pile driver hammer, capacity 1500 hp.

The Lubbock Cotton Compress Co., Lubbock, Tex., is planning the erection of a new one-story compress plant, estimated to cost $80,000 including machinery.

G. H. Brummell & Co., East Twelfth Street, Anniston, Ala., manufacturers of automobile bodies, are planning to rebuild the portion of their two-story plant recently destroyed by fire with loss reported at $40,000 including equipment.

The Leesburg Fibre Pulp & Paper Co., Leesburg, Fla., has authorized plans for a new paper mill at Jacksonville, Fla., where negotiations have been closed for the purchase of 1½ acres adjoining the shipyard of the Merrill-Stevens Co. The main mill will be 50 x 300 ft., with smaller adjoining structures for other departments. A one-story machine shop will be built and a steam-electric power plant. The initial works will cost $500,000 with machinery. Raw mate-

rial will be furnished from the company's plant at Leesburg. Gilbert D. Leach is secretary and treasurer.

The Texas Farm Labor Union, Bonham, Tex., R. R. Claridge, in charge, has preliminary plans for a new cold storage plant at Dallas, Tex., estimated to cost $45,000.

The Gulf States Chemical & Refining Co., 608 American Trust Building, Birmingham, has plans for new works at Montgomery, Ala., estimated to cost $200,000 with machinery. The installation will include pumping machinery, pulverizers, agitators, tanks, mechanical drying equipment and auxiliary machinery. John M. Gallalee is in charge.

Manual training equipment will be installed in the new two-story high school to be erected at Georgetown, Tex., estimated to cost $100,000, for which ground will be broken at once. The Board of Education is in charge.

Manual training equipment will be installed in the new high school to be erected at Eufaula, Ala., estimated to cost $100,000, for which bids are being taken on a general contract. Frank Lockwood, Montgomery, Ala., is architect.

The Humble Oil & Refining Co., Dallas, Tex., is planning for the construction of a new gasoline refinery at Corsicana, Tex., estimated to cost $200,000 with machinery.

W. M. Smith & Co., P. O. Box 1709, Birmingham, Ala., machinery dealers, have inquiries out for a locomotive crane, one wheel press and one standard gage locomotive.

A machine shop will be installed in the two-story automobile and service building, 75 x 120 ft., to be erected by Freeman & Sons, Inc., 3644 North Second Avenue, Buena Vista, Fla. The company was organized recently with a capital of $100,000. H. J. Freeman is head.

The Uvalde Co., 607 City National Bank Building, San Antonio, Tex., has inquiries out for a steam shovel, 1 to 2 yd. capacity, crawler type.

The Madison Oil & Coal Co., Houston, Tex., Hall Etter, president, has acquired lignite property in the vicinity of Calvert, Tex., and contemplates the installation of a complete mining plant, including electric power, hoisting and conveying machinery, etc.

The Common Council, Wylie, Tex., is considering plans for the installation of electrically-operated pumping machinery in connection with its proposed new waterworks estimated to cost $50,000. The Municipal Engineering Co., Praetorian Building, Dallas, Tex., is engineer.

A machine shop will be installed in the new automobile service and repair building to be erected by the Watson Corporation, 213 Congress Building, Miami, Fla., estimated to cost $120,000. C. M. Watson is construction engineer, in charge.

The Steel Products Co., Box 194, Savannah, Ga., is in the market for a medium sized belt-driven bull-dozer for bending structural sections.

The Pacific Coast

SAN FRANCISCO, Sept. 11.

FIRE, Sept. 8, destroyed the mill and power house of the Fir Tree Lumber Co., Olympia, Wash., with loss estimated at $250,000. It is planned to rebuild.

The Grand Rapids Show Case Co., Grand Rapids, Mich., has awarded a general contract to Dougan & Chrisman, Hinckley Building, Seattle, for the first unit of its new plant at Portland, Ore., to be three-stories, estimated to cost $110,000 with equipment. Plans are in progress for other units, to represent a total investment of about $1,000,000, including machinery. Sutton & Whitney, Lewis Building, Portland, are architects.

The Golden Seal Refining Corporation, Riverside, Cal., has preliminary plans for a new gasoline refinery, estimated to cost $150,000. Temporary offices have been established in the Glenwood Mission Garage Building, West Seventh Street.

The Chevrolet Motor Co. of California, Foothill Boulevard and Sixty-ninth Avenue, Oakland, Cal., is having plans drawn for a one-story and basement addition to its local plant, to cost $125,000. The company engineering department is in charge.

Fire, Sept. 8, destroyed a portion of the plant of the Harrington Harvester Co., Harrington, Wash., manufacturer of harvesting machinery, etc., with loss estimated at $200,000, including equipment. It is planned to rebuild.

The Jackson-Bischoff Auto Battery & Accessory Co., Portland, Ore., has plans nearing completion for a new factory estimated to cost $100,000. Schacht & Bergen, Yeon Building, are architects.

The Perfo Piston Ring Co., Los Angeles, has awarded a general contract to F. L. Froley, 942 South Normandie Avenue, for a one-story factory on West Twelfth Street. Stromwell & Halperin, 300 Ferguson Building, are architects.

The Shell Oil Co. of California, 343 Sansome Street, San Francisco, has superstructure work under way on a new refinery at Wilmington, Los Angeles, and plans to install machinery for a daily capacity of about 20,000 bbl.

The California Wire Cloth Co., 1001 Twenty-second Avenue, Oakland, Cal., has awarded contracts to McDonald & Kahn, 130 Montgomery Street, San Francisco, for a one-story addition, to cost $50,000.

The Puget Sound Light & Power Co., Seattle, is planning the construction of a new power house at Union and Western Avenues, estimated to cost $50,000.

The Coast Oilfields Supply Co., Los Angeles, manufacturer of oil-drilling and oil well machinery, has awarded contract to the Lavery Construction Co., 543 Bradbury Building, for a two-story plant on Long Beach Avenue, estimated to cost $35,000.

The Board of Education, Monrovia, Cal., has plans for a one-story addition to the manual arts building at the high school, to be used as an automobile mechanic workshop and machine shop.

The Western Fruit Express Co., 1505 Pioneer Building, St. Paul, Minn., is planning the erection of a new one-story railroad car repair shop at Hillyard, Wash., estimated to cost $55,000. F. G. Luth is mechanical superintendent in charge.

The Coast Valley Gas & Electric Co., Monterey, Cal., is disposing of a bond issue of $250,000, a portion of the proceeds to be used for extensions in generating plants and system.

The Board of Public Works, Spokane, Wash., is planning for the installation of electrically-operated pumping machinery in connection with improvements in the municipal waterworks, for which an appropriation of $139,600 has been arranged.

The Carlisle-Pannell Lumber Co., Okalaska, Wash., is planning the construction of a new mill and power house at Carlisle, Wash., to replace its plant recently destroyed by fire.

The C. F. Bulotti Machinery Co., San Francisco, is in the market for a 200-ton standard sectional flanging press, 1500-lb. working pressure, a 300-ton, 72-in. hydraulic wheel press; rolling machine for handling 8-in. channels and angles; angle roller for handling maximum 8-in. channels and angles; No. 3 Cincinnati Acme universal turret lathe.

The Byron Jackson Pump Mfg. Co., Berkeley, Cal., is inquiring for a 400- or 600-hp., three-phase, 60-cycle, 2200-volt horizontal motor.

Trade Changes

C. M. Decker, Philadelphia sales representative of the Geo. T. Ladd Co., manufacturer of Ladd water tube boilers, has moved his office from the Land Title Building to 504 Franklin Bank Building.

Hereafter the Arnold Electric Drill Co., Inc., West Haven, Conn., will be known as the National Electric Mfg. Co.

The Continental Can Co. has purchased the can and tube department of the National Can Co., Detroit. The latter company will retain the buildings and will manufacture automobile radiators exclusively.

William J. Doherty, formerly of the Continental Iron & Steel Co., New York, has opened a branch office at 30 Church Street for the David J. Joseph Co., Cincinnati, dealer in iron and steel scrap, relaying rails, pig iron, bars, plates and sheets.

The Watson Engineering Co., New York and Cleveland, has changed its name to the Watson Co., architect and engineer. The New York office under the management of Charles Watson, is located at 15 Park Row.

The Standard Turbine Corporation, Wellsville, N. Y., has appointed the Percy E. Wright Engineering Co. as agent in the Seattle, Wash., territory, with offices at 2012 L. C. Smith Building.

Industrial Finances

The St. Louis Coke & Iron Co. reports net earnings of $1,389,498 for the year ended Aug. 31, 1923. After preferred dividends there was a remainder equal to 8¾ per cent on the 89,400 shares of common stock outstanding.

Action has been deferred until this week on a petition for authority to issue $50,000 in receiver's certificates to pay current expenses of the Harrisburg Foundry & Machine Co. of Harrisburg, Pa., for which a receiver was named several weeks ago. B. E. Taylor, treasurer of the company, testified that the money is needed to pay operating expenses. The payroll is $5,000 weekly and the firm now has orders amounting to $170,000. It is believed by the receiver, Christian W. Lynch, a former official of the company, that profits on the orders will be sufficient to redeem the receiver's certificates and to place the company on a firm financial basis.

Plans of New Companies

The Farmelectric Corporation, New York, organized in May, is now manufacturing power plants for farm use, through the Poole Engineering & Machine Co., Woodberry, Baltimore, at the rate of 75 per week, and it is likely that this number will have to be increased to meet orders. All replacement parts for these plants are Ford parts. Address care of the Takamine Mfg. Corporation, 342 Madison Avenue.

The Mercury Steam Car Corporation, 523 Monadnock Building, San Francisco, has been incorporated with $10,000,000 capital stock, and will engage in manufacturing steam-driven automobiles. Part of the equipment will be built by the company and part will be let by contract. Operations are expected to begin in the near future. W. T. Dickson is president and F. N. Sessions is secretary-treasurer.

The United States Cutlery Co., Belleville, N. J., has been incorporated with capital stock of $300,000 and has purchased the plant, machinery and raw stocks of the Knickerbocker Mfg. Co., that city. Manufacture will be continued in the same line with the addition of stainless steel cutlery. Machinery has been contracted for. W. A. Magee is one of the principals.

The Morse Mfg. Co., 325 West Fayette Street, Syracuse, N. Y., has been incorporated with $50,000 capital stock to manufacture automotive equipment, taking over a business established for four years. J. M. Morse heads the company and G. L. Clook is sales manager.

The Steelcraft Parts Co., 3160 West 106th Street, Cleveland, organized to take over the plant and equipment of the Structural Tool Co., Cleveland, now has a factory, fully equipped, and is manufacturing a line of rivet sets, chisel blanks, bushings, punches and dies. C. L. Wasmer is president; C. E. Kramer, vice-president, and J. C. Wasmer, secretary.

The Scranton Supply & Machinery Co., has been organized by William H. Taylor to handle machinery, tools and supplies for mines, railroads and machine shops. T. M. Voyle is president; E. R. Holgate, vice-president, and D. C. Voyle, secretary-treasurer. It is located at 634-48 Wyoming Avenue, Scranton.

The Sundh Mfg. Corporation, 342 Madison Avenue, New York, has been organized to manufacture flexible metal couplings. Mr. Sundh of the Sundh Electric Co., Newark, N. J., and the Sundh Engineering & Machine Co., Philadelphia, has withdrawn from these companies to become affiliated with the new organization, whose plant at Hastings, N. Y., will be put on an operating basis at an early date. Other products will likely be added to the line later. Address M. F. Mason.

J. B. Hauer, Inc., 100 Bayard Street, Brooklyn, recently incorporated with $100,000 capital stock and operating a general machine works, is in the market for equipment which will be installed in a building 160 x 200 ft., recently purchased and located at Fifth Avenue and North Driggs Street. J. B. Hauer heads the company.

The Portable Electric Cabinet Co., New York, has been incorporated with capital stock of $50,000 to manufacture electric equipment. Its chief product will be a collapsible metal cabinet. The incorporators are: S. Rosenthal and H. Hymowitz. Address care of Benjamin Koenigsberg, 93 Nassau Street, New York.

Delway Heaters, Inc., New York, has been incorporated with capital stock of $250,000 to manufacture heating equipment and kindred engineering products. Its principal product is an oil-burning heater for domestic and industrial purposes. The incorporators are: J. A. Barrett, A. H. Haaren and A. Wallander. The company plans to install equipment in a factory somewhere in New York and to begin manufacturing at an early date. Address care of Mr. Weyers, 165 Broadway.

E. Blout, Inc., New York, organized with $500,000 capital stock, will manufacture talking machines. Plans are unknown, but it is expected that temporary offices will be located at 2756 Broadway. E. R. Rye and E. Blout are incorporators. Address care of S. M. Kronheimer, 49 Chambers Street.

Plans of the Pacific Coast Fibre Co., Seattle, Wash., organized in July to manufacture mechanical products, are entirely indefinite. Should the project be resumed, notice will be given in these columns. Battle, Hulbert, Gates & Helsell, Alaska Building, Seattle, represent the company.

The Cutaway Harrow Co., Higganum, Conn., incorporated with $75,000 capital stock, will continue a business long established in the manufacture of disk harrows and plows. E. S. Hubbard is president; E. R. Austin, vice-president, and A. H. Hubbard, secretary-treasurer.

The Rapid Heater Co., Grand Rapids, Mich., has been organized with $50,000 capital stock to manufacture various types of gas water heaters. It will take over a business established since 1904, but further details are lacking. E. M. Newman, 1130½ Sigsbee Street, Grand Rapids, is manager.

The Art Products Co., Inc., Zeeland, Mich., has been incorporated for the purpose of manufacturing novelties, having purchased the assets and business of a firm in this line. Manufacturing is done on a small scale through contract. P. J. Osborne is manager.

The National Wheel & Axle Co., Inc., Victory Building, 1011 Chestnut Street, Philadelphia, recently incorporated with capital stock of $750,000, will erect a plant for the manufacture of automobile axles and wheels. Decision has not been reached as to the location of the plant, but it will be either in Ohio or northern Indiana. Equipment will be purchased. Edwin J. Weston heads the company.

The Irvington Machine Co., Badger Avenue and Runyon Street, Newark, N. J., incorporated with capital of 2500 shares of no par value stock, will manufacture Trubloc cylinder grinders. R. H. Stone is secretary.

The Steel Materials Co., 5639 Roby Place, Detroit, and 506 Society of Savings Building, Cleveland, recently incorporated, has completed steel and concrete buildings for manufacturing building stanchions and toy automobiles. The company will also carry a full line of new and second hand pipe, couplings, flats, rounds, bars and surplus and salvage material, including rails and bar steel. It will also have the exclusive agency for the Canton Foundry & Machine Co. for alligator shears in Michigan. Charles Marienthal is president and general manager and H. A. Velick, who is also conected with the Velick Scrap Iron & Machinery Co., is secretary-treasurer.

The Logan Cut-Out Switch Mfg. Co., Logan, W. Va., has been formed with capital stock of $100,000 to manufacture patented switches. Immediate manufacturing will be done by contract, the work already having been placed. It is expected that plans will soon be drawn for the construction of a plant. William Abraham heads the company.

The Oneida Mfg. Co., Green Bay, Wis., recently formed with capital stock of $500,000, has acquired the assets and business of the Oneida Motor Truck Co., at Green Bay, and will continue operation along the same line. The company also expects to maufacture gasoline railroad cars and power equipment. L. W. Melcher is president and general manager.

The Michigan Body Corporation, St. John, Mich., has been incorporated with capital stock of $65,000 and will manufacture commercial and other automobile bodies. It has a plant fully equipped to conduct its business for present needs. The incorporators are B. F. Wright, H. D. Minich and W. L. Beitler, Jr., secretary-treasurer Triangle Motor Truck Co., St. John. All the incorporators are officers of the Triangle Motor Truck Co.

The Hays Brass & Aluminum Foundry Co., Michigan City, Ind., has been incorporated with capital of $50,000 and will manufacture brass and aluminum products. The company will operate a plant at Michigan City and one at La Porte, Ind.

The Flanders Co., 53 Pennsylvania Avenue, Newark, N. J., recently organized to manufacture and deal in fabricated steel products has discontinued business.

The Oldsmar Automotive Accessory Corporation, Oldsmar, Fla., recently formed to manufacture accessories, has taken over the foundry and machine shop of the Oldsmar Mfg. Co., and will reconstruct the plant to suit this line of manufacture.

The Midwest Air Filters Pacific, Inc., care of H. B. M. Miller, Royal Insurance Building, San Francisco, recently incorporated with $75,000 capital stock, contemplates no manufacturing, but will act as distributor for the Midwest Steel & Supply Co., 28 West Forty-fourth Street, New York, in the Pacific territory. Stocks will be carried in warehouses at various points throughout the territory. Its line includes steel sections, box rails, steel stringers, filters and gas washing machines. W. B. Lomak is general manager.

The American Car Door Co., Michigan City, Ind., has been incorporated with $25,000 capital stock to manufacture door and other hardware products. Plans are undeveloped. H. E. Osborn is secretary-treasurer.

The Roberts-Ward Corporation, Castle Hall Building, Indianapolis, recently organized to manufacture machinery and parts, will have all its work done by contract, one letting already having been made. W. A. Cohen is president.

The Highway Appliance Co., 115 Pine Street, Providence, R. I., organized with capital stock of $50,000, will manufacture machines for traffic marking. These are now being built by the General Machinery Co., Providence. R. G. McMeehan, 14 Pearl Avenue, is representative of the new company.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—41	—24	½ in. Butt...	— 4	+19
¾ in. Butt...	—46	—32	¾ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap...	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18½c. to 19½c.
High brass wire	19 c. to 20 c.
Brass rods	16¾c. to 17¾c.
Brass tube, brazed	26½c. to 27½c.
Brass tube, seamless	24 c. to 25 c.
Copper tube, seamless	25½c. to 26½c.

Copper Sheets

Sheet copper, hot rolled, 21¼c. to 22¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb..	$6.55 $6.30
		90 lb..	6.65 6.40
		100 lb..	6.75 6.50
IC..	$12.55 $10.70	IC..	7.00 6.75
IX..	13.95 12.55	IX..	8.25 8.00
IXX..	15.55 13.75	IXX..	9.50 9.25
IXXX..	17.10 15.30	IXXX..	10.75 10.50
IXXXX..	18.85 16.80	IXXXX..	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	49c. to 56c.

Copper

Lake ingot	16¾c.
Electrolytic	16¼c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8⅛c. to 8½c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

Business has slowed down again and the market is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.25
Cast aluminum	15.00
Sheet aluminum	15.00